SLV-772HF/ 779HF

RMT-V266

SERVICE MANUAL

US Model

SLV-779HF

Canadian Model

SLV-772HF/779HF

Photo: SLV-779HF
RMT-V266

S MECHANISM

Refer to the SERVICE MANUAL of VHS MECHANICAL ADJUSTMENT Ⅵ for MECHANICAL ADJUSTMENTS. (9-921-647-11)

SPECIFICATIONS

System

Format
- VHS NTSC standard

Video recording system
- Rotary head helical scanning FM system

Video heads
- Double azimuth four heads

Video signal
- NTSC color, EIA standards

Tape speed
- SP: 33.35 mm/s (1 3/8 inches/s)
- EP: 11.11 mm/s (7/16 inches/s)
- LP: 16.67 mm/s (11/16 inches/s), playback only

Maximum recording/playback time
- 8 hrs. in EP mode (with T-160 tape)

Fast-forward and rewind time
- Approx. 3 min. (with T-120 tape)

Tuner section

Channel coverage
- VHF 2 to 13
- UHF 14 to 69
- CATV A-8 to A-1, A to W, W+1 to W+84

Antenna
- 75-ohm antenna terminal for VHF/UHF

Inputs and outputs

LINE-1 IN and -2 IN
- VIDEO IN, phono jack (1 each)
- Input signal: 1 Vp-p, 75 ohms, unbalanced, sync negative
- AUDIO IN, phono jacks (2 each)
- Input level: 327 mVrms
- Input impedance: more than 47 kilohms

LINE OUT
- VIDEO OUT, phono jack (1)
- Output signal: 1 Vp-p, 75 ohms, unbalanced, sync negative
- AUDIO OUT, phono jacks (2)
- Standard output: 327 mVrms
- Load impedance: 47 kilohms
- Output impedance: less than 10 kilohms

CABLE BOX CONTROL (CONTROL S OUT)
- Stereo mini jack (plug in power) (1)

Timer section

Clock
- Quartz locked

Timer indication
- 12-hour cycle

Timer setting
- 8 programs per month (max.)

Power back-up
- Built-in self-charging capacitor
- Back-up duration: up to 1 hour at a time

General

Power requirements
- 120 V AC, 60 Hz

Power consumption
- 24 W

Operating temperature
- 5°C to 40°C (41°F to 104°F)

Storage temperature
- –20°C to 60°C (–4°F to 140°F)

Dimensions
- Approx. 430 × 100 × 287 mm (w/h/d) (Approx. 17 × 4 × 11 3/8 inches) including projecting parts and controls

Mass
- Approx. 4.0 kg (8 lb 13 oz)

Supplied accessories

Remote commander (1)
Size AA (R6) batteries (2)
75-ohm coaxial cable with F-type connectors (1)
Audio/video cable (3 phono to 3 phono) (1)

Design and specifications are subject to change without notice.

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As an ENERGY STAR Partner, Sony Corporation has determined that this product meets the ENERGY STAR guidelines for energy efficiency.

VIDEO CASSETTE RECORDER

MICROFILM

SONY®

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer.

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
5. Check the line cord for cracks and abrasion. Recommend the replacement of any such line cord to the customer.
6. Check the B+ voltage to see it is at the values specified.
7. Check the antenna terminals, metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

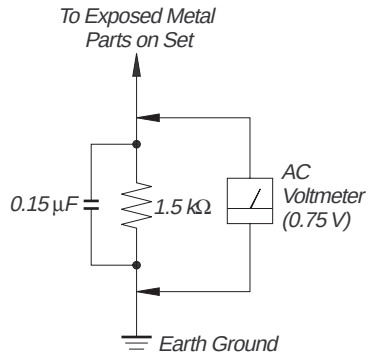


Fig. A. Using an AC voltmeter to check AC leakage.

LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5mA (500 microampers). Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA TW-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75V, so analog meters must have an accurate low voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2V AC range are suitable. (See Fig. A)

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ!

LES COMPOSANTS IDENTIFÉS PAR UNE MARQUE ⚠ SUR LES DIAGRAMMES SCHÉMATIQUES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈSES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DANS LES SUPPÉMENTS PUBLIÉS PAR SONY.

TABLE OF CONTENTS

SERVICE NOTE

1. ERROR CODE INDICATION ····· 4

1. GENERAL

Getting Started

- Unpacking ····· 1-1
- Setting up the remote commander ····· 1-1
- Hookups ····· 1-2
- Selecting a language ····· 1-8
- Setting the clock ····· 1-9
- Setting up the cable box control ····· 1-10
- Presetting channels ····· 1-12
- Setting up the VCR Plus+ system ····· 1-14

Basic Operations

- Playing a tape ····· 1-14
- Recording TV programs ····· 1-15
- Recording TV programs using the VCR Plus+ system ····· 1-16
- Setting the timer manually ····· 1-17

Additional Operations

- Playing/searching at various speeds ····· 1-18
- Searching for a selected point on the tape ····· 1-18
- Skip-searching automatically ····· 1-19
- Setting the recording duration time ····· 1-19
- Checking/changing/canceling timer settings ····· 1-19
- Recording stereo and bilingual programs ····· 1-20
- Adjusting the picture ····· 1-20
- Changing menu options ····· 1-21
- Editing with another VCR ····· 1-21

Additional information

- General setup information ····· 1-22
- Index to parts and controls ····· 1-22

2. DISASSEMBLY

2-1. CASE, FRONT PANEL BLOCK ASSEMBLY ····· 2-1
2-2. MF-316 BOARD, DM-84 BOARD ····· 2-1
2-3. REAR PANEL ····· 2-2
2-4. MA-341 BOARD ····· 2-2
2-5. MECHANISM DECK ····· 2-3
2-6. INTERNAL VIEWS ····· 2-4
2-7. CIRCUIT BOARDS LOCATION ····· 2-5

3. BLOCK DIAGRAMS

3-1. OVERALL BLOCK DIAGRAM ····· 3-1
3-2. VIDEO BLOCK DIAGRAM ····· 3-3
3-3. SERVO/SYSTEM CONTROL/TUNER BLOCK DIAGRAM ····· 3-5
3-4. AUDIO BLOCK DIAGRAM ····· 3-7
3-5. POWER BLOCK DIAGRAM ····· 3-9

4. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

4-1. FRAME SCHEMATIC DIAGRAM ····· 4-3
4-2. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS ····· 4-5

- MA-341 (VUDEO, AUDIO, SERVO/SYSTEM CONTROL, TUNER, POWER SUPPLY) PRINTED WIRING BOARD ····· 4-5
- MA-341 (1/7) (VIDEO) SCHEMATIC DIAGRAM ····· 4-7
- MA-341 (2/7) (AUDIO) SCHEMATIC DIAGRAM ····· 4-9
- MA-341 (3/7) (SERVO/SYSTEM CONTROL) SCHEMATIC DIAGRAM ····· 4-11
- MA-341 (4/7) (AUDIO PROCESS) SCHEMATIC DIAGRAM ····· 4-13
- MA-341 (5/7) (TUNER) SCHEMATIC DIAGRAM ····· 4-15
- MA-341 (6/7) (MODE CONTROL) SCHEMATIC DIAGRAM ····· 4-
- MA-341 (7/7) (POWER SUPPLY) SCHEMATIC DIAGRAM ····· 4-
- DM-84 (TAPE OPARATION) PRINTED WIRING BOARD ····· 4-
- DM-84 (TAPE OPARATION) SCHEMATIC DIAGRAM ····· 4-
- MF-316 (POWER/EJECT SWITCH) SCHEMATIC DIAGRAM ····· 4-23
- MF-316 (POWER/EJECT SWITCH) PRINTED WIRING BOARD ····· 4-

5. INTERFACE, IC PIN FUNCTION DESCRIPTION

SYSTEM CONTROL — MECHANISM BLOCK INTERFACE (MA-341 BOARD IC160) ····· 5-1
SYSTEM CONTROL — SERVO PERIPHERAL CIRCUIT INTERFACE (MA-341 BOARD IC160) ····· 5-1
SYSTEM CONTROL — SYSTEM CONTROL PERIPHERAL CIRCUIT INTERFACE (MA-341 BOARD IC160) ····· 5-
SYSTEM CONTROL AND RF MODULATOR — INPUT SELECTION BLOCK INTERFACE (MA-341 BOARD IC160) ····· 5-
SYSTEM CONTROL — VIDEO/RP BLOCK INTERFACE (MA-341 BOARD IC160) ····· 5-2
SYSTEM CONTROL — AUDIO BLOCK INTERFACE (MA-341 BOARD IC160) ····· 5-2
SERVO/SYSTEM CONTROL MICROPROCESSOR PIN FUNCTIONS (MA-341 BOARD IC160) ····· 5-3

6. ADJUSTMENTS

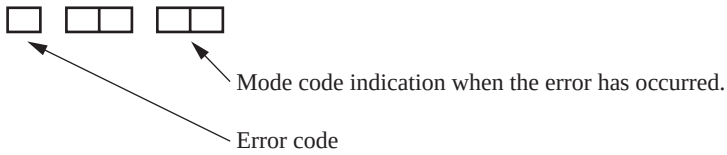
6-1 MECHANICAL ADJUSTMENTS ····· 6-1
6-2. ELECTRICAL ADJUSTMENTS ····· 6-1
2-1-2-1 PREPARATION BEFORE ADJUSTMENT ····· 6-1
2-1-2. Equipment Required ····· 6
2-1-3. Equipment Connection ····· 6
2-1-4. Set-up of Adjustment ····· 6
2-1-4. Alignment Tape ····· 6
2-1-5. Input/Output Levels and Impedance ····· 6-2
2-1-6. Adjustment Sequence ····· 6
2-2. POWER SUPPLY CHECK ····· 6-
2-2-1. Output Voltage Check (MA-341 Board) ····· 6-2
2-3. SERVO SYSTEM CHECK ····· 6-
2-3-1. RF Switching Position Adjustment (MA-341 Board) ····· 6
2-4. AUDIO SYSTEM ADJUSTMENT ····· 6-3
2-4-1. Hi-Fi Audio System Adjustment ····· 6-3
(Hi-Fi model only) ····· 6
2-4-2. HiFi Switching Position Adjustment (MA-341 Board) ····· 6
2-4-3. Normal Audio System Adjustment ····· 6-4
2-4-4. ACE Head Adjustment ····· 6
2-4-5. E-E Output Level Check ····· 6
2-4-6. Frequency Response Check ····· 6-
2-5. ADJUSTING PARTS LOCATION DIAGRAM ····· 6-6

7. REPAIR PARTS LIST

7-1. EXPLODED VIEWS ····· 6
7-1-1. FRONT PANEL AND UPPER CASE SECTION ····· 7-1
7-1-2. CHASSIS SECTION ····· 6
7-1-3. MECHANISM DECK SECTION-1 ····· 7-3
7-1-4. MECHANISM DECK SECTION-2 ····· 7-4
7-1-5. MECHANISM DECK SECTION-3 ····· 7-5
7-2. ELECTRICAL PARTS LIST ····· 7-6

1. ERROR CODE INDICATION

- Error codes are indicated using the lower 5 digits in the fluorescent display tube.
  "At this time, Colon ":" between character is not indicated."



ERROR CODE

0	No error
1	Cam encoder error Loading direction
2	Cam encoder error Unloading direction
3	T reel error
4	S reel error
5	Capstan error
6	Drum error
7	Error on initializing
8	Cassette loading error
9	Reserve

MODE CODE

0	Power-on eject	10	FWD x1	20	REW play
1	Power-on initial	11	FWD x2	21	Cas. loading
2	Power-off eject	12	CUE	22	Tape loading
3	Power-off stop	13	PB-pause	23	Power-off loading
4	FF	14	RVS-pause	24	Mecha. error (Power on)
5	REW	15	RVS x1	25	Power-on eject initial
6	REC	16	RVS x2	26	Power-off eject initial
7	REC- pause	17	REV	27	APC REC
8	Power-on stop	18	Power-off initial	28	Cas. loading
9	PB	19	Mecha. error (Power off)		(No auto PB check)

SECTION 1
GENERAL

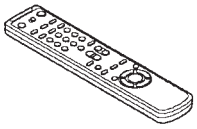
This section is extracted from instruction manual.

Step 1

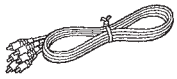
Unpacking

Check that you have received the following items with the VCR:

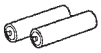
- Remote commander



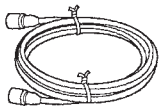
- Audio/video cable (3-phono to 3-phono)



- Size AA (R6) batteries



- 75-ohm coaxial cable with F-type connectors

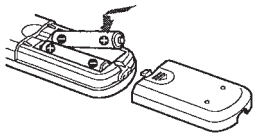


Step 2

Setting up the remote commander

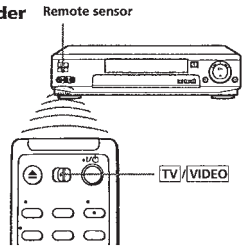
Inserting the batteries

Insert two size AA (R6) batteries by matching the + and – on the batteries to the diagram inside the battery compartment.
Insert the negative (–) end first, then push in and down until the positive (+) end clicks into position.



Using the remote commander

You can use this remote commander to operate this VCR and a Sony TV. Buttons on the remote commander marked with a dot (•) can be used to operate your Sony TV.



To operate	Set TV/VIDEO to
the VCR	VIDEO and point at the remote sensor on the VCR
a Sony TV	TV and point at the remote sensor on the TV

continued

Step 2: Setting up the remote commander (continued)

Notes

- With normal use, the batteries should last about three to six months.
- If you do not use the remote commander for an extended period of time, remove the batteries to avoid possible damage from battery leakage.
- Do not use a new battery with an old one.
- Do not use different types of batteries.

Controlling other TVs with the remote commander

The remote commander is preprogrammed to control non-Sony TVs. If your TV is listed in the table below, set the appropriate manufacturer's code number.

1 Set TV/VIDEO at the top of the remote commander to TV.

2 Hold down I/⏻, and enter your TV's code number(s) using the number buttons. Then release I/⏻.

Now you can use the I/⏻, VOL +/–, CH +/–, and TV/VIDEO buttons to control your TV. You can also use the buttons marked with a dot (•) to control a Sony TV. To control the VCR, reset TV/VIDEO to VIDEO.

Code numbers of controllable TVs

If more than one code number is listed, try entering them one at a time until you find the one that works with your TV.

Manufacturer	Code number	Manufacturer	Code number	Manufacturer	Code number
Sony	01	JVC	09	RCA	04, 10
Akai	04	KMC	03	Sampo	12
AOC	04	Magnavox	03, 08, 12	Sanyo	11
Centurion	12	Marantz	04, 13	Scott	12
Coronado	03	MGA/Mitsubishi	04, 12, 13, 17	Sears	07, 10, 11
Curis-Mathes	12	NEC	04, 12	Sharp	03, 05, 18
Daytron	12	Panasonic	06, 19	Sylvania	08, 12
Emerson	03, 04, 14	Philco	03, 04	Teknika	03, 08, 14
Fisher	11	Philips	08	Toshiba	07
General Electric	06, 10	Pioneer	16	Wards	03, 04, 12
Gold Star	03, 04, 17	Portland	03	Yorx	12
Hitachi	02, 03	Quasar	06, 18	Zenith	15
J.C.Penny	04, 12	Radio Shack	05, 14		

Notes

- If the TV uses a different remote control system from the one programmed to work with the VCR, you cannot control your TV with the remote commander.
- If you enter a new code number, the code number previously entered will be erased.
- When you replace the batteries of the remote commander, the code number may change. Set the appropriate code number every time you replace the batteries.
- When you press the AUDIO MONITOR button, your TV's menu may appear on the TV's screen.
  To exit the TV menu, press the MENU button on the TV remote commander or wait until the menu disappears automatically.

Step 3
Hookups

Selecting the best hookup option

There are many ways in which your VCR can be hooked up. To hook up your VCR so that it works best for you, first scan through the table below. Then use the accompanying diagrams and procedures on the following pages to set up your VCR.

If you have	Use	Refer to
TV that has audio/video inputs	**Audio/video (A/V) hookup,** then follow one of the hookups below.	**Pages 9 and 10**
Cable box that is compatible with the VCR's cable box control feature	**Hookup 1**	**Pages 11 to 14**
No cable box or incompatible cable box with only a few scrambled channels	**Hookup 2**	**Pages 15 to 18**
Antenna only, no cable TV	**Hookup 3**	**Pages 19 to 22**
Incompatible cable box with many scrambled channels	**Hookup 4**	**Pages 23 to 26**
DIRECTV* digital satellite receiver	**Hookup 5**	**Pages 27 to 29**
Incompatible cable box with only a few scrambled channels, using an A/B switch	**Hookup 6**	**Pages 30 to 34**

After you've completed the connections, follow the instructions for setup. During setup, if you need more details on the procedure described, page numbers are provided where you can find complete, step-by-step instructions.

After you've completed the setup, you're ready to use your VCR. Procedures differ depending on the hookup you used. For an overview, refer to "Quick reference to using the VCR" on the back cover.

Before you get started

- Turn off the power to all equipment.
- Do not connect the AC power cords until all of the connections are completed.
- Be sure you make connections firmly. Loose connections may cause picture distortion.
- If your TV doesn't match any of the examples provided, see your nearest Sony dealer or qualified technician.

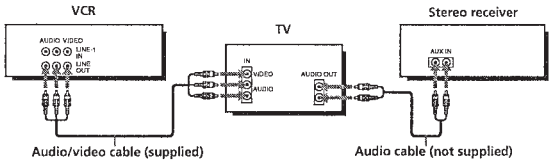
* DIRECTV is a trademark of DIRECTV, Inc., a unit of Hughes Electronics Corporation.

Audio/video (A/V) hookup — Pages 9 and 10

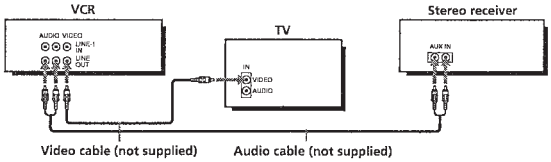
If your TV has audio/video (A/V) input jacks, you will get a better picture and sound if you hook up your VCR using these connections. In addition, for a true "home theater" experience, you should connect the audio outputs of your VCR or TV to your stereo system. If your TV doesn't have A/V inputs, see the following pages for antenna or cable hookups.

If you're not planning to use your VCR to record programs, you're finished setting up the VCR after you've made the connections shown on this page. If you want to record off-air or off your cable TV system, complete these connections first, and then go to the following pages for antenna or cable hookups.

A Use this hookup if your TV has stereo jacks



B Use this hookup if your TV doesn't have stereo jacks



Note

- To play a tape in stereo, you must use the A/V connection.

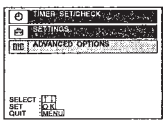
continued

Step 3: Hookups (continued)

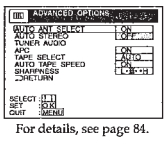
A/V hookup: VCR setup

After you've connected your TV and completed antenna or cable hookup, use the following procedure to set up the VCR.

Press MENU and select ADVANCED OPTIONS.



Set AUTO ANT SELECT to OFF and press OK.



For details, see page 84.

Caution

Connections between the VCR's VHF/UHF connector and the antenna terminals of the TV receiver should be made only as shown in the following instructions. Failure to do so may result in operation that violates the regulations of the Federal Communications Commission regarding the use and operation of RF devices. Never connect the output of the VCR to an antenna or make simultaneous (parallel) antenna and VCR connections at the antenna terminals of your receiver.

Note to CATV system installer (in USA)

This reminder is provided to call the CATV system installer's attention to Article 820-40 of the NEC that provides guidelines for proper grounding and, in particular, specifies that the cable ground shall be connected to the grounding system of the building, as close to the point of cable entry as practical.

Hookup 1 — Pages 11 to 14

Using cable box control

Recommended use

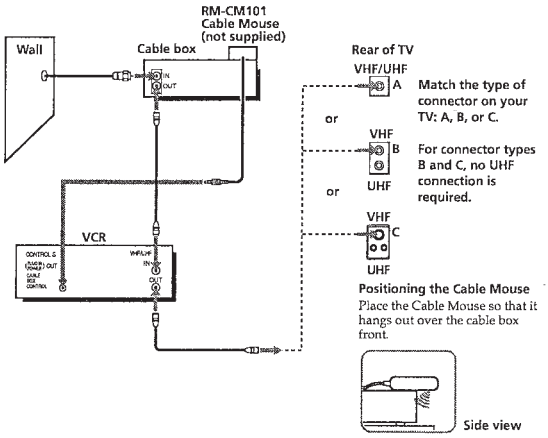
You should use this hookup if you have a cable box, especially if your cable system scrambles all or most channels. This hookup allows the VCR's cable box control feature to control the channel on the cable box, simplifying the recording process. A list of compatible cable boxes is on pages 45 to 47.

What you can do with this hookup

- Record any channel using the VCR's cable box control feature to select channels on the cable box

What you can't do

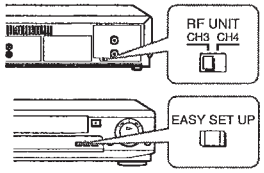
- Record with the cable box turned off
- Record one channel while watching another channel



continued

Hookup 1: VCR setup

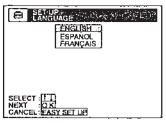
1 Set the RF UNIT switch to CH3 or CH4, whichever channel is not used in your area. If both are used, set the switch to either channel. For details, see page 88. If you made A/V connections (page 9), you can skip this step.



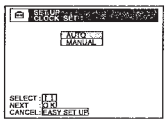
2 Turn on your cable box.

3 Press EASY SET UP on the VCR.

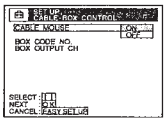
❶ The LANGUAGE menu appears. Change the on-screen display language to Spanish (ESPAÑOL) or French (FRANÇAIS) if desired, and press OK. For details, see page 35.



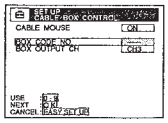
❷ The CLOCK SET menu appears. Select AUTO and press OK. For details, see page 37.



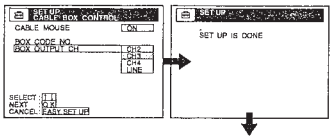
❸ The CABLE BOX CONTROL menu appears. Select ON. For details, see page 44.



❹ Enter your cable box code number and press OK. For details, see page 44.



❺ Select your cable box output channel and press OK.



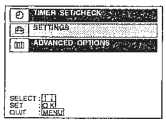
Normal display

Hookup 1: The VCR Plus+ system channel setup

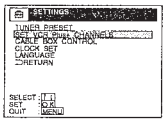
1 Find the VCR Plus+ system Channel Listing in your program guide. For details, see page 56.

2 If the channels in the program guide are different from the channels that you actually use on your TV, set the channels that are different as follows. For details, see page 57.

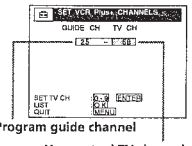
❶ Press MENU, then select SETTINGS and press OK.



❷ Select SET VCR Plus+ CHANNELS and press OK.



❸ Enter the program guide channel, then the channel you use on your TV.



Program guide channel

Your actual TV channel

❹ Press OK.

❺ Press MENU to exit the menu.

continued

Automatic clock setting

Once you've set up the VCR, it automatically sets the clock the first time you turn off the VCR. After that, whenever you turn off the VCR, it checks the time and adjusts the clock, even for Daylight Saving Time. The VCR sets the clock by picking up a time signal provided by some TV channels.

If you want to use the timer to record right away, or if the channels in your area do not carry time signals, set the clock manually. For details, see page 41.

Note

- To use the Auto Clock Set feature, leave the cable box on.

Hookup 2 Pages 15 to 18

No cable box, or incompatible cable box with only a few scrambled channels

Recommended use

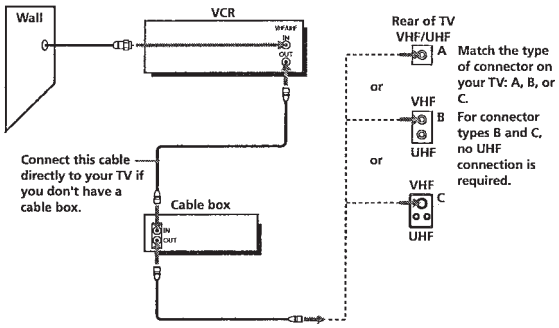
Use this hookup if you do not have a cable box. Also use this hookup if your cable company cannot supply a cable box that is compatible with the VCR's cable box control feature, and your cable system scrambles only a few channels.

What you can do with this hookup

- Record any unscrambled channel by selecting the channel on the VCR

What you can't do

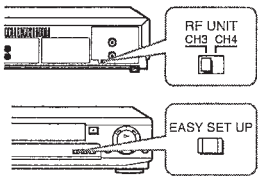
- Record scrambled channels that require a cable box



continued

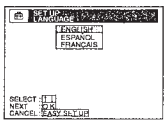
Hookup 2: VCR setup

1 Set the RF UNIT switch to CH3 or CH4, whichever channel is not used in your area. If both are used, set the switch to either channel. For details, see page 88.
If you made A/V connections (page 9), you can skip this step.

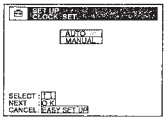


2 Press EASY SET UP on the VCR.

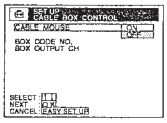
❶ The LANGUAGE menu appears. Change the on-screen display language to Spanish (ESPAÑOL) or French (FRANÇAIS) if desired, and press OK. For details, see page 35.



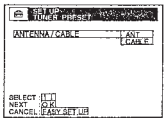
❷ The CLOCK SET menu appears. Select AUTO and press OK. For details, see page 37.



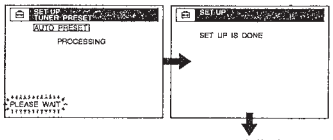
❸ The CABLE BOX CONTROL menu appears. Select OFF and press OK.



❹ The TUNER PRESET menu appears. Set ANTENNA/CABLE to CABLE and press OK. For details, see page 50.



❺ The AUTO PRESET starts.



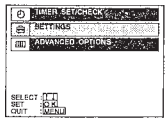
Normal display

Hookup 2: The VCR Plus+ system channel setup

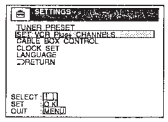
1 Find the VCR Plus+ system Channel Listing in your program guide. For details, see page 56.

2 If the channels in the program guide are different from the channels that you actually use on your TV, set the channels that are different as follows. For details, see page 57.

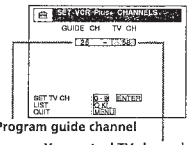
❶ Press MENU, then select SETTINGS and press OK.



❷ Select SET VCR Plus+ CHANNELS and press OK.



❸ Enter the program guide channel, then the channel you use on your TV.



Program guide channel

Your actual TV channel

❹ Press OK.

❺ Press MENU to exit the menu.

continued

Automatic clock setting

Once you've set up the VCR, it automatically sets the clock the first time you turn off the VCR. After that, whenever you turn off the VCR, it checks the time and adjusts the clock, even for Daylight Saving Time. The VCR sets the clock by picking up a time signal provided by some TV channels.

If you want to use the timer to record right away, or if the channels in your area do not carry time signals, set the clock manually. For details, see page 41.

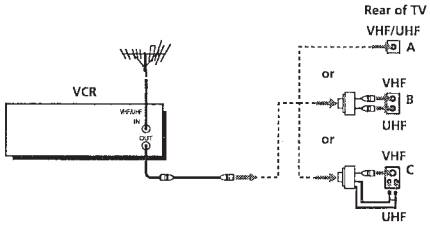
Hookup 3 Pages 19 to 22

Antenna hookup

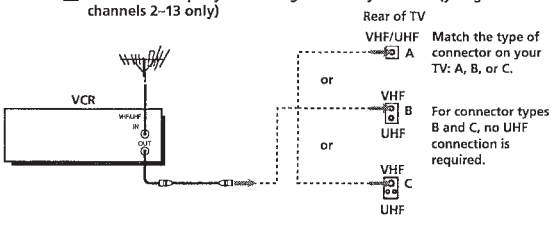
Make the following connections if you're using an antenna (if you don't have cable TV).

A Use this hookup if you're using:

- VHF/UHF antenna (you get channels 2–13 and channels 14 and higher)
- UHF-only antenna (you get channels 14 and higher)
- Separate VHF and UHF antennas



B Use this hookup if you're using a VHF-only antenna (you get channels 2–13 only)



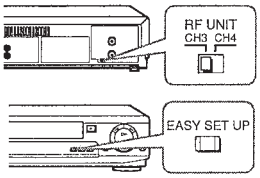
If you cannot connect your antenna cable to the VCR directly

If your antenna cable is a flat cable (300-ohm twin lead cable), attach an external antenna connector (not supplied) so you can connect the cable to the VHF/UHF IN connector. If you have separate cables for VHF and UHF antennas, you should use a U/V band mixer (not supplied). For details, see page 89.

continued

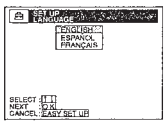
Hookup 3: VCR setup

1 Set the RF UNIT switch to CH3 or CH4, whichever channel is not used in your area. If both are used, set the switch to either channel. For details, see page 88. If you made A/V connections (page 9), you can skip this step.

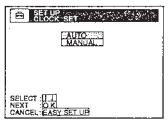


2 Press EASY SET UP on the VCR.

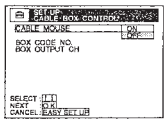
❶ The LANGUAGE menu appears. Change the on-screen display language to Spanish (ESPAÑOL) or French (FRANÇAIS) if desired, and press OK. For details, see page 35.



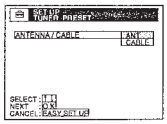
❷ The CLOCK SET menu appears. Select AUTO and press OK. For details, see page 37.



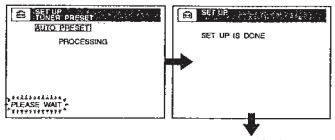
❸ The CABLE BOX CONTROL menu appears. Select OFF and press OK.



❹ The TUNER PRESET menu appears. Set ANTENNA/CABLE to ANT and press OK. For details, see page 50.



❺ The AUTO PRESET starts.



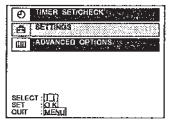
Normal display

Hookup 3: The VCR Plus+ system channel setup

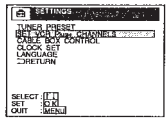
1 Find the VCR Plus+ system Channel Listing in your program guide. For details, see page 56.

2 If the channels in the program guide are different from the channels that you actually use on your TV, set the channels that are different as follows. For details, see page 57.

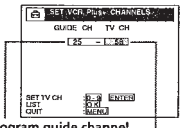
❶ Press MENU, then select SETTINGS and press OK.



❷ Select SET VCR Plus+ CHANNELS and press OK.



❸ Enter the program guide channel, then the channel you use on your TV.



Program guide channel

Your actual TV channel

❹ Press OK.

❺ Press MENU to exit the menu.

continued

Automatic clock setting

Once you've set up the VCR, it automatically sets the clock the first time you turn off the VCR. After that, whenever you turn off the VCR, it checks the time and adjusts the clock, even for Daylight Saving Time. The VCR sets the clock by picking up a time signal provided by some TV channels.

If you want to use the timer to record right away, or if the channels in your area do not carry time signals, set the clock manually. For details, see page 41.

Hookup 4 — Pages 23 to 26

Incompatible cable box with many scrambled channels

Recommended use

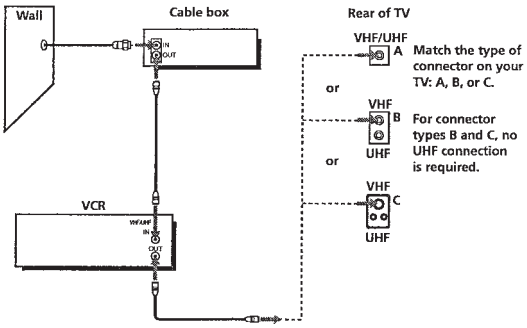
Use this hookup if your cable company cannot supply a cable box that is compatible with the VCR's cable box control feature, and your cable system scrambles all or most channels.

What you can do with this hookup

- Record any channel by selecting the channel on the cable box

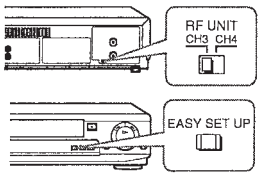
What you can't do

- Record with the cable box turned off
- Record one channel while watching another channel



continued

Hookup 4: VCR setup

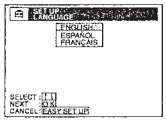


1 Set the RF UNIT switch to CH3 or CH4, whichever channel is not used in your area. If both are used, set the switch to either channel.
For details, see page 88.
If you made A/V connections (page 9), you can skip this step.

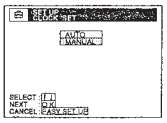
2 Turn on your cable box.

3 Press EASY SET UP on the VCR.

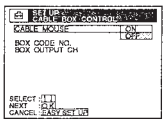
❶ The LANGUAGE menu appears. Change the on-screen display language to Spanish (ESPAÑOL) or French (FRANÇAIS) if desired, and press OK. For details, see page 35.



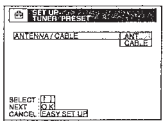
❷ The CLOCK SET menu appears. Select MANUAL and press OK. Then set the clock manually and press OK. For details, see page 42.



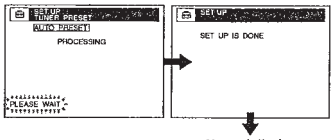
❸ The CABLE BOX CONTROL menu appears. Select OFF and press OK.



❹ The TUNER PRESET menu appears. Set ANTENNA/CABLE to ANT and press OK. For details, see page 50.



❺ The AUTO PRESET starts.



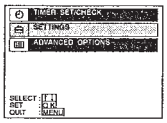
Normal display

Hookup 4: The VCR Plus+ system channel setup

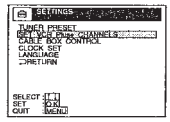
1 Find the VCR Plus+ system Channel Listing in your program guide. For details, see page 56.

2 Enter all the channels you want to record and the cable box output channel (usually 2, 3, or 4). For details, see page 57.

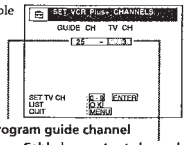
❶ Press MENU, then select SETTINGS and press OK.



❷ Select SET VCR Plus+ CHANNELS and press OK.



❸ Enter the program guide channel, then the cable box output channel.



Program guide channel
Cable box output channel

❹ Press OK.

❺ Press MENU to exit the menu.

continued

Automatic clock setting

To use the Auto Clock Set feature with this hookup, you need to manually select a channel that carries a time signal:

1 Tune the cable box to a channel that carries a time signal.

2 Select AUTO in the CLOCK SET menu to turn on the Auto Clock Set feature.

3 Turn off the VCR. It automatically sets the clock and adjusts for Daylight Saving Time by picking up the time signal.

If you want to use the timer to record right away, or if the channels in your area do not carry time signals, set the clock manually. For details, see page 41.

Note

- To use the Auto Clock Set feature, leave the cable box on.

Hookup 5 Pages 27 to 29

DIRECTV digital satellite receiver

Recommended use

Use this hookup if you have a DIRECTV digital satellite receiver. It allows the VCR's cable box control feature to control the channel on the DIRECTV digital satellite receiver, simplifying the recording process. A list of compatible DIRECTV digital satellite receivers is on page 47.

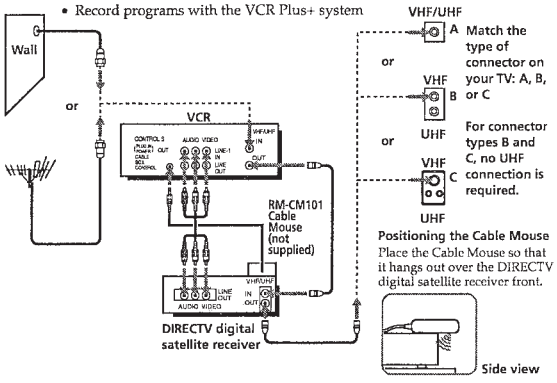
The DIRECTV system is a satellite broadcast that provides superior digital-quality video and crisp digital-quality audio. A variety of program packages are available through your program providers. It also has program guides that are sorted by program categories.

What you can do with this hookup

- Record any channels using the VCR's cable box control feature to select channels on the DIRECTV digital satellite receiver.

What you can't do

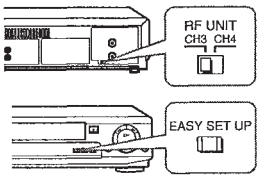
- Record with the DIRECTV digital satellite receiver turned off
- Record any channels from cable or an antenna
  (To record channels from cable or an antenna, turn off the cable box control feature.)
- Use a cable box
- Record programs with the VCR Plus+ system



continued

Hookup 5: VCR setup

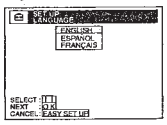
1 Set the RF UNIT switch to CH3 or CH4, whichever channel is not used in your area. If both are used, set the switch to either channel. For details, see page 88. If you made A/V connections (page 9), you can skip this step.



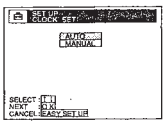
2 Turn on your DIRECTV digital satellite receiver.

3 Press EASY SET UP on the VCR.

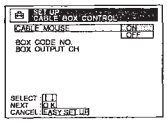
❶ The LANGUAGE menu appears. Change the on-screen display language to Spanish (ESPAÑOL) or French (FRANÇAIS) if desired, and press OK. For details, see page 35.



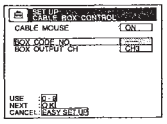
❷ The CLOCK SET menu appears. Select AUTO and press OK. For details, see page 37.



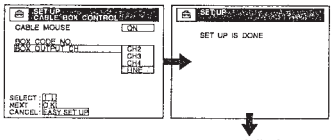
❸ The CABLE BOX CONTROL menu appears. Select ON. For details, see page 44.



❹ Enter your DIRECTV digital satellite receiver code number and press OK. For details, see page 44.



❺ Set your DIRECTV digital satellite receiver output channel (BOX OUTPUT CH) to LINE and press OK.



Normal display

Automatic clock setting

Once you've set up the VCR, it automatically sets the clock the first time you turn off the VCR. After that, whenever you turn off the VCR, it checks the time and adjusts the clock, even for Daylight Saving Time. The VCR sets the clock by picking up a time signal provided by some TV channels.

If you want to use the timer to record right away, or if the channels in your area do not carry time signals, set the clock manually. For details, see page 41.

Note

- To successfully record a program from the DIRECTV digital satellite receiver, proceed as follows:
  - Leave the DIRECTV digital satellite receiver on all the time.
  - Turn off the display (menu screen, channel number, etc.) of the DIRECTV digital satellite receiver.
  - To record or receive locked channels, unlock the channel before the VCR starts recording.
  - To set pay-per-view programs in the timer setting, order the pay-per-view program before the VCR starts recording.
  - Some programs are copy protected. You cannot record these programs.

continued

Hookup 6 Pages 30 to 34

Incompatible cable box with only a few scrambled channels, using an A/B switch

Recommended use

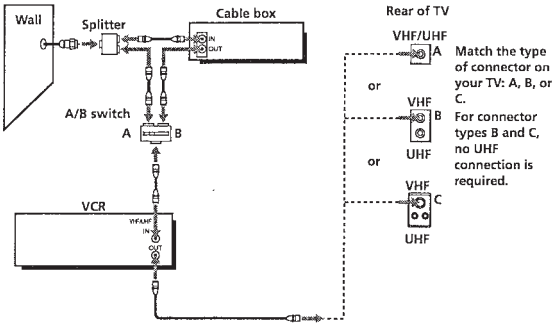
By using an A/B switch (not supplied), this hookup allows you to record both scrambled and unscrambled channels conveniently.

What you can do with this hookup

- Record any unscrambled channel by selecting the channel directly on the VCR (the A/B switch is set to A)
- Record any scrambled channel by selecting the channel on the cable box (the A/B switch is set to B)

What you can't do

- Record one scrambled channel while watching another channel (the A/B switch is set to B)

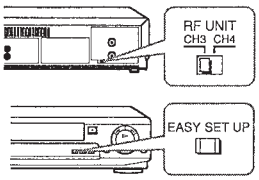


Match the type of connector on your TV: A, B, or C.

For connector types B and C, no UHF connection is required.

Hookup 6: VCR setup

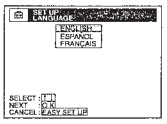
1 Set the RF UNIT switch to CH3 or CH4, whichever channel is not used in your area. If both are used, set the switch to either channel. For details, see page 88. If you made A/V connections (page 9), you can skip this step.



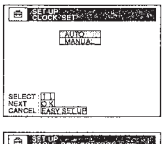
2 Set the A/B switch to "A."

3 Press EASY SET UP on the VCR.

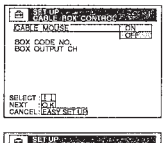
❶ The LANGUAGE menu appears. Change the on-screen display language to Spanish (ESPAÑOL) or French (FRANÇAIS) if desired, and press OK. For details, see page 35.



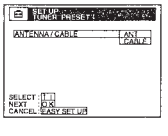
❷ The CLOCK SET menu appears. Select AUTO and press OK. For details, see page 37.



❸ The CABLE BOX CONTROL menu appears. Select OFF and press OK.

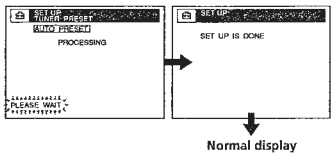


❹ The TUNER PRESET menu appears. Set ANTENNA/CABLE to CABLE and press OK. For details, see page 50.



continued

❺ The AUTO PRESET starts.

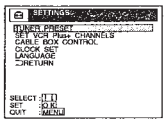


Normal display

4 Preset the cable box output channel (usually 2, 3 or 4). For details, see page 52.

❶ Press MENU, then select SETTINGS and press OK.

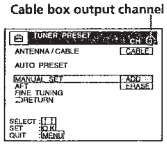
❷ Select TUNER PRESET and press OK.



❸ Enter the cable box output channel.

❹ Set MANUAL SET to ADD and press OK.

Cable box output channel



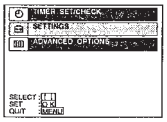
❺ Press MENU to exit the menu.

Hookup 6: The VCR Plus+ system channel setup

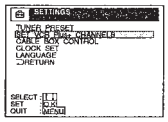
1 Find the VCR Plus+ system Channel Listing in your program guide. For details, see page 56.

2 To set the program guide channels for unscrambled channels, if the channels in the program guide are different from the channels that you actually use on your TV, set the channels that are different as follows. For details, see page 57.

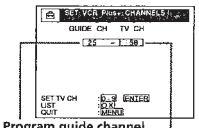
❶ Press MENU, then select SETTINGS and press OK.



❷ Select SET VCR Plus+ CHANNELS and press OK.



❸ Enter the program guide channel, then the channel you use on your TV.



Program guide channel

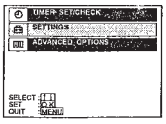
Your actual TV channel

❹ Press OK.

❺ Press MENU to exit the menu.

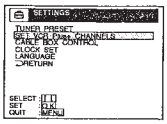
3 To set the program guide channels for scrambled channels, enter all the scrambled channels you want to record and the cable box output channel (usually 2, 3, or 4). For details, see page 57.

❶ Press MENU, then select SETTINGS and press OK.



continued

❷ Select SET VCR Plus+ CHANNELS and press OK.



❸ Enter the program guide channel, then the cable box output channel.

Program guide channel

Cable box output channel

❹ Press OK.

❺ Press MENU to exit the menu.

Automatic clock setting

Once you've set up the VCR, it automatically sets the clock the first time you turn off the VCR. After that, whenever you turn off the VCR, it checks the time and adjusts the clock, even for Daylight Saving Time. The VCR sets the clock by picking up a time signal provided by some TV channels.

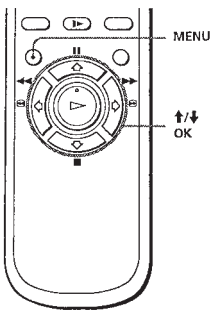
If you want to use the timer to record right away, or if the channels in your area do not carry time signals, set the clock manually. For details, see page 41.

Note

- To use the Auto Clock Set feature, set the A/B switch to "A."

Selecting a language

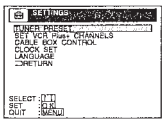
You can change the on-screen display language.



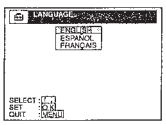
1 MENU

Press MENU, then press ↑/↓ to highlight SETTINGS and press OK.

When using the EASY SET UP procedure, skip steps 1 and 2.



2 Press ↑/↓ to highlight LANGUAGE, then press OK.



3 Press ↑/↓ to highlight ENGLISH, ESPAÑOL, or FRANÇAIS, then press OK.

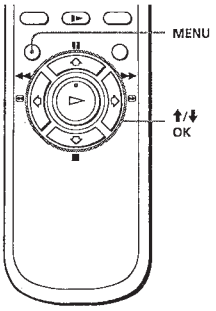
4 MENU

Press MENU to exit the menu.

Tip

- If you want to return to the previous menu, highlight RETURN and press OK.

Setting the clock



Using the Auto Clock Set feature

Some TV and cable channels transmit time signals with their broadcasts. Your VCR can pick up this time signal to automatically set the clock.

The Auto Clock Set feature works only if a channel in your area is broadcasting a time signal. If broadcasters in your area are not yet sending time signals, set the time manually (page 41).

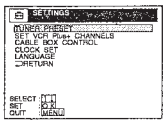
Before you start...

- Turn on the VCR and the TV.
- Set the TV to the VCR channel (channel 3 or 4). If your TV is connected to the VCR using A/V connections, set the TV to video input.
- Press TV/VIDEO to display the VIDEO indicator in the VCR's display window.
- Press INPUT SELECT so that a channel number appears in the VCR's display window.

1 MENU

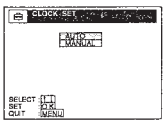
Press MENU, then press ↑/↓ to highlight SETTINGS and press OK.

When using the EASY SET UP procedure, skip steps 1 and 2.



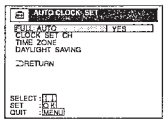
2

Press ↑/↓ to highlight CLOCK SET, then press OK.



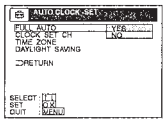
3

Press ↑/↓ to highlight AUTO, then press OK.



4

Press ↑/↓ to highlight FULL AUTO, then press OK.



5

Press ↑/↓ to highlight YES, then press OK.

6 MENU

Press MENU to exit the menu.

7

To activate the Auto Clock Set function, turn off the VCR.

The VCR automatically sets the clock by searching for a channel that carries a time signal and sets your time zone and Daylight Saving Time (if applicable).

If your clock is set to the wrong time zone or Daylight Saving Time, you can adjust these settings without turning off the Auto Clock Set feature (page 38).

Tip

- If you want to return to the previous menu, highlight RETURN and press OK.

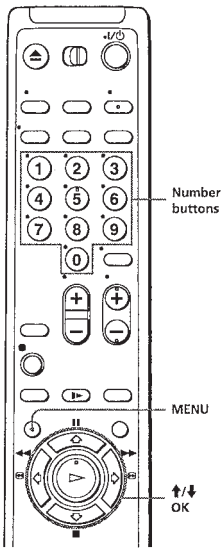
Notes

- The clock cannot be set automatically if you don't receive a channel that carries a time signal in your area. If so, set the clock manually.
- If there are only a few channels in your area that carry time signals, setting the clock automatically may take up to about 30 minutes. If nothing happens even after you wait about 30 minutes, set the clock manually.
- If you use Hookup 1, make sure you leave the cable box on.

continued

Setting the clock (continued)

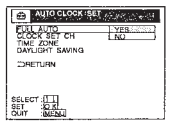
If the clock is not activated



1

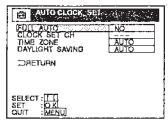
Follow steps 1 to 4 in "Using the Auto Clock Set feature."

The AUTO CLOCK SET menu is displayed.



2

Press ↑/↓ to highlight NO for FULL AUTO and press OK.

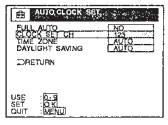


3

Press ↑/↓ to highlight the item you want to set and press OK. Then press ↑/↓ to make the setting and press OK.

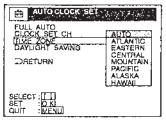
- For CLOCK SET CH

  Leave the setting to "– – –" to have the VCR automatically search for a channel that carries a time signal.
  Press the number buttons to select a channel that carries a time signal.
  Use this option if you know of a channel that carries a time signal. Most PBS member stations broadcast a time signal. For the fastest response, select your local PBS station.



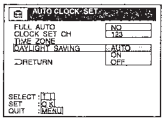
- For TIME ZONE

  Select the time zone of your area, or select AUTO to have the VCR automatically set your time zone.
  The options are:
  AUTO ↔ ATLANTIC ↔ EASTERN ↔ CENTRAL ↔ MOUNTAIN ↔ PACIFIC ↔ ALASKA ↔ HAWAII ↔ AUTO



- For DAYLIGHT SAVING

  Select ON or OFF (standard time), or AUTO to have the VCR automatically set the daylight saving time.



continued

Setting the clock (continued)

4 MENU — Press MENU to exit the menu.

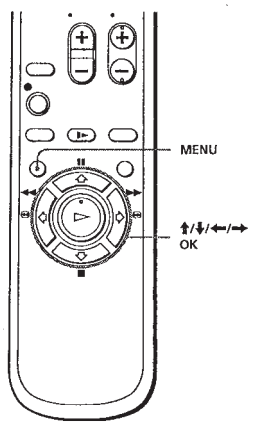
5 To activate the Auto Clock Set function, turn off the VCR.

Tip
- If you want to return to the previous menu, highlight RETURN and press OK.

Note
- If you use both the cable box control feature and the Auto Clock Set feature, the VCR automatically changes channels on the cable box until a channel that carries a time signal is found, whenever you turn off the VCR.
  If you want to stop the search, change the channel on the cable box with the channel buttons either on the VCR or on the remote commander.

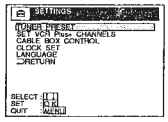
Using Manual Clock Set

Before you start...
- Turn on the VCR and the TV.
- Set the TV to the VCR channel (channel 3 or 4). If your TV is connected to the VCR using A/V connections, set the TV to video input.
- Press TV/VIDEO to display the VIDEO indicator in the VCR's display window.

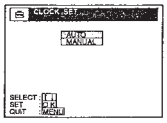


1 MENU — Press MENU, then press ↑/↓ to highlight SETTINGS and press OK.

When using the EASY SET UP procedure, skip steps 1 and 2.



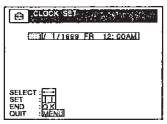
2 Press ↑/↓ to highlight CLOCK SET, then press OK.



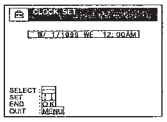
continued

Setting the clock (continued)

3 Press ↑/↓ to highlight MANUAL, then press OK.

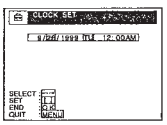


4 Press ↑/↓ to set the month.



5 Press → to highlight the day and press ↑/↓ to set the day.

The day of the week is set automatically.



6 Set the year, hour, and minutes in the same way as the day.

7 Press OK to start the clock.

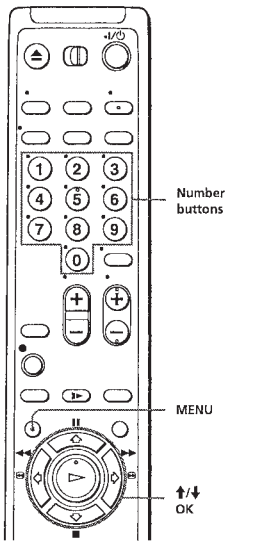
Tip
- If you want to return to the previous menu, highlight RETURN and press OK.

Setting up the cable box control

(Skip this section if you are using Hookup 2, 3, 4, or 6.)

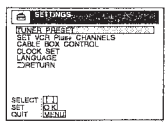
Your VCR includes a cable box control feature that allows the VCR to control most brands of cable boxes/DIRECTV digital satellite receivers via an optional Cable Mouse. With cable box control, the VCR controls channels on the cable box/DIRECTV digital satellite receiver for timer recording. You can also use the VCR's remote commander to change channels on the cable box/DIRECTV digital satellite receiver whenever the cable box/DIRECTV digital satellite receiver is turned on even if the VCR is turned off. To use cable box control, you need to connect the Sony RM-CM101 Cable Mouse (not supplied) (pages 11 and 27) and set the code number and output channel.

This VCR is programmed with codes necessary to control channel selection on most brands of cable boxes at the time this VCR was manufactured. It is possible that new cable boxes may be introduced that cannot be controlled with the RM-CM101 Cable Mouse. If you have a cable box that is incompatible with this VCR, contact your cable operator — they may be able to provide you with a compatible cable box.



1 MENU — Press MENU, then press ↑/↓ to highlight SETTINGS and press OK.

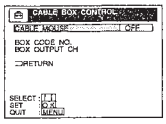
When using the EASY SET UP procedure, skip steps 1 and 2.



continued

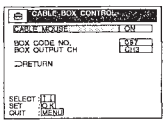
Setting up the cable box control (continued)

2 Press ↑/↓ to highlight CABLE BOX CONTROL, then press OK.



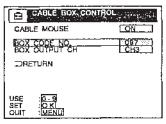
3 Press ↑/↓ to highlight CABLE MOUSE, then press OK.

4 Press ↑/↓ to highlight ON, then press OK.



5 Press ↑/↓ to highlight BOX CODE NO., then press OK.

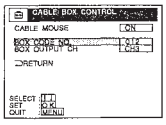
When BOX CODE NO. is "– – –," skip this step.



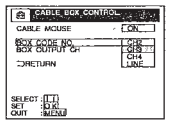
6 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⓪

Press the number buttons to enter the cable box/DIRECTV digital satellite receiver code number, then press OK.

Find your cable box/DIRECTV digital satellite receiver code number from the chart below.



7 Press ↑/↓ to highlight BOX OUTPUT CH, then press OK.



8 If you want to control a cable box, press ↑/↓ to highlight the cable box output channel, then press OK.

If you want to control a DIRECTV digital satellite receiver, select LINE, then press OK.

9 MENU

Press MENU to exit the menu.

Cable box and DIRECTV digital satellite receiver brand and the corresponding code numbers

If more than one code number is listed, try entering them one by one, until you come to the correct code for your equipment.

Cable box brand	Code numbers
ABC	018, 022, 024, 028, 217
Antronix	218
Archer	033, 050, 164, 218, 808
BBT	278
Cable Star	067
Cableterna	033
Cable time	172, 388, 459
Century	164
Citizen	164, 326, 327
Clyde Cablevision	097
Colour Voice	036, 042
Comband	243, 244
Comtronics	051, 071

Cable box brand	Code numbers
Decsat	434
Diamond	046
Eagle Comtronics	051
Eastern	013, 285
Electricord	089
Electus	055
Focus	411
Garrard	164
GC Electronics	027, 067, 341
GE	243, 244
GEC	097
Gemini	026, 068, 081
General Instrument	022, 287, 487

continued

Setting up the cable box control (continued)

Cable box brand	Code numbers
Hamlin	020, 031, 045, 270, 284
Hitachi	022
Jasco	164, 326
Jerrold	014, 022, 025, 026, 035, 037, 058, 109, 287, 487
Linsay	451
Macom	044
Magnavox	038, 043, 080
Memorex	011
Movie Time	089, 167, 214
Northcoast	325
Novaplex	629
NSC	074, 081, 167, 214
Oak	018, 030, 259
Panasonic	032, 118
Paragon	011
Philips	036, 038, 039, 040, 041, 042, 071, 301
Pioneer	034, 155, 271, 544, 695
Popular Mechanics	411
Pulsar	011
Radio shack	808
RCA	032
Realistic	218
Recoton	411
Regal	031, 270, 284, 290
Regency	013
Rembrandt	081
Samsung	051, 155
Scientific Atlanta	017, 019, 028, 288
Seam	521

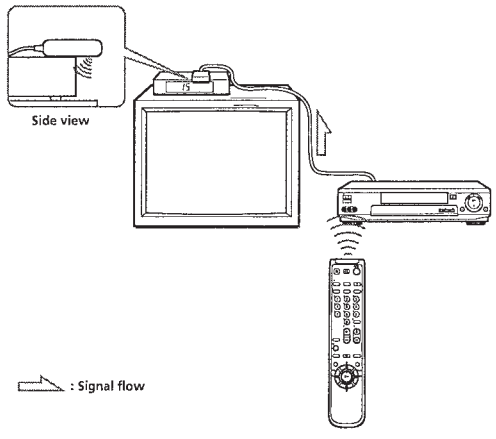
Cable box brand	Code numbers
Sharp	324
Signal	051
Signature	022
SL Marx	051
Spectravision	069
Sprucer	032, 318
Standard Components	107, 166
Starcom	014, 026, 058, 109
Stargate	026, 051
STS	167
Sylvania	012
T-Cable Teletext	116
Tandy	269
Tatung	108
Teknica	157
TeleCaption	232
Teleservice	292
Texscan	012, 107
TFC	321
Timeless	429
Tocom	023, 024
Toshiba	011
Tudi	297
TV86	074
TV COM	018, 030, 259
Uniden	236
Unika	033, 164, 218
United Artists	018
United Cable	014
Universal	033, 050, 067, 088, 089, 164, 202, 218, 333

Cable box brand	Code numbers
Videoway	261
Vidtech	255
Viewstar	038, 071, 074, 122, 222, 269, 300
Zenith	011, 065, 536
Zentek	411
Wave Master	576

DIRECTV digital satellite receiver brand	Code numbers
Hitachi	830
RCA	577
Sony	650
Toshiba	801

To ensure correct operation

- Place the Cable Mouse so that it hangs out over the cable box/DIRECTV digital satellite receiver front.
- Do not place the cable box/DIRECTV digital satellite receiver on top of the VCR.
- Position the cable box/DIRECTV digital satellite receiver away from the VCR.
- Point the remote commander at the VCR, not at the cable box/DIRECTV digital satellite receiver.



continued

To check the cable box control setting

1 Press CH +/– on the remote commander. Does the channel indicator on the cable box/DIRECTV digital satellite receiver change? (Point the remote commander at the VCR, not at the cable box/DIRECTV digital satellite receiver.)

2 Press all 10 number buttons (0 to 9) on the remote commander. Does the channel indicator on the cable box/DIRECTV digital satellite receiver change?

If the answer to both 1 and 2 is "yes," you have made the correct setting.

If you cannot get your VCR to control the cable box/DIRECTV digital satellite receiver

- Check that the Cable Mouse is connected to the CABLE BOX CONTROL jack on the VCR.
- Check the position of the Cable Mouse.
- Place the cable box/DIRECTV digital satellite receiver and VCR away from each other. Do not place the cable box/DIRECTV digital satellite receiver on top of the VCR.
- Try the setup again making sure to use the correct control code. If the cable box still does not respond, try the other codes that are listed.

If your cable box still does not operate with the Cable Mouse, contact your cable company to see if they can provide you with a compatible cable box.

Tip

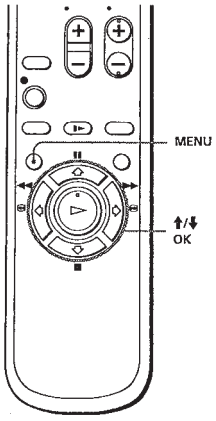
- If you want to return to the previous menu, highlight RETURN and press OK.

Note

- Make sure you turn off the VCR when you plug in or unplug the Cable Mouse. If you unplug the Cable Mouse and plug it in again, turn on the VCR before you use the cable box/DIRECTV digital satellite receiver control feature.

Presetting channels

(Skip this section if you are using cable box/DIRECTV digital satellite receiver control.)



This VCR is capable of receiving VHF channels 2 to 13, UHF channels 14 to 69 and unscrambled CATV channels 1 to 125. First, we recommend that you preset the receivable channels in your area using automatic presetting. Then, if there are any unwanted channels, disable them manually. If you have decided which channels you wish to preset, set them directly using manual presetting.

Before you start...

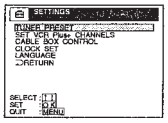
- Turn on the VCR and the TV.
- Set the TV to the VCR channel (channel 3 or 4). If your TV is connected to the VCR using A/V connections, set the TV to video input.
- Press TV/VIDEO to display the VIDEO indicator in the VCR's display window.

Presetting all receivable channels automatically

1 MENU

Press MENU, then press ↑/↓ to highlight SETTINGS and press OK.

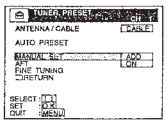
When using the EASY SET UP procedure, skip steps 1 and 2.



continued

2

Press ↑/↓ to highlight TUNER PRESET, then press OK.



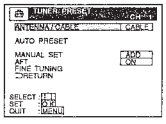
3

Press ↑/↓ to highlight ANTENNA/CABLE, then press OK.

4

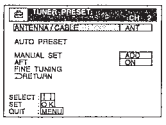
• To preset cable TV channels:

Press ↑/↓ to set ANTENNA/CABLE to CABLE, then press OK.



• To preset VHF and UHF channels:

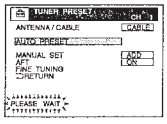
Press ↑/↓ to set ANTENNA/CABLE to ANT, then press OK.



5

Press ↑/↓ to highlight AUTO PRESET, then press OK.

All receivable channels are preset in numerical sequence. When no more receivable channels can be found, presetting stops and the picture from the lowest numbered channel is displayed on the TV screen.



Tips

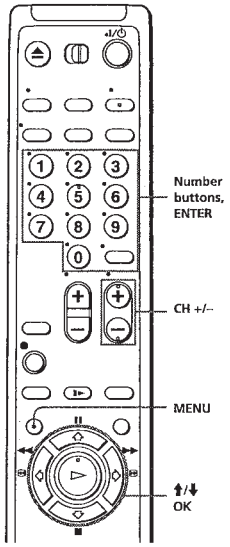
- When receiving a VHF, UHF, or CATV channel, the display changes as follows each time you press DISPLAY.

Channel number
↓
Remaining tape length, and time counter
↓
The bar indicator and pointer for searching a specific point
↓
No display

- If you want to return to the previous menu, highlight RETURN and press OK.

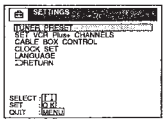
continued

Presetting/disabling channels manually



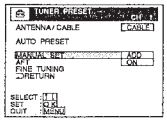
1 MENU

Press MENU, then press ↑/↓ to highlight SETTINGS and press OK.



2

Press ↑/↓ to highlight TUNER PRESET, then press OK.

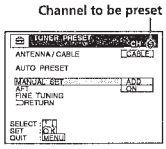


3

- To preset a channel:

1 Press the number buttons to enter the channel number, then press ENTER.
2 Press OK.
3 Press ↑/↓ to set MANUAL SET to ADD, then press OK.

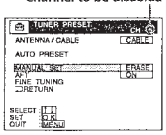
Channel to be preset



- To disable a channel:

1 Press CH +/– to select the channel number.
2 Press OK.
3 Press ↑/↓ to set MANUAL SET to ERASE, then press OK.

Channel to be disabled



4 MENU

Repeat step 3 to preset or disable channels as required, then press MENU.

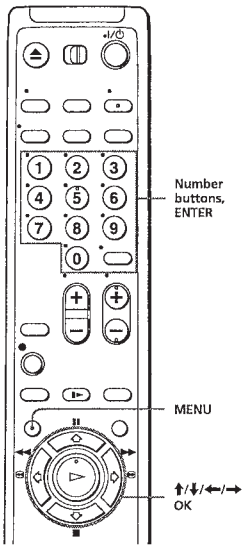
Tip

- If you want to return to the previous menu, highlight RETURN and press OK.

continued

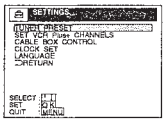
If the picture is not clear

Normally, the Auto Fine Tuning (AFT) function automatically tunes in channels clearly. If, however, the picture of a channel is not clear, you can also use the manual tuning function.



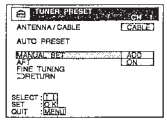
1 MENU

Press MENU, then press ↑/↓ to highlight SETTINGS and press OK.



2

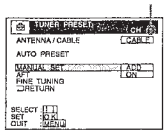
Press ↑/↓ to highlight TUNER PRESET, then press OK.



3

Press the number buttons to select the channel you want to fine-tune, then press ENTER.

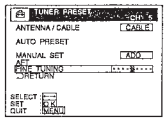
Selected channel



4

Press ↑/↓ to highlight FINE TUNING, then press OK.

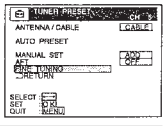
The fine tuning meter appears.



5

Press ←/→ to adjust to a clearer picture, then press OK.

Note that the AFT setting switches to OFF.



6 MENU

Press MENU to exit to the menu.

Tips

- To select the channel on step 3 above, you can also use the CH +/– buttons. In this case, you don't need to press ENTER.
- If you want to return to the previous menu, highlight RETURN and press OK.

Note

- When adjusting FINE TUNING, the menu may become difficult to read due to interference from the picture being received.

Setting up the VCR Plus+ system

How the VCR Plus+ system works

Whenever you want to record a TV program, all you need to do is look up the "PlusCode" number, a number assigned to each program published in the TV section of most newspapers, cable TV listings, and even *TV GUIDE* magazine. Then, just enter the PlusCode number of the program you want and the VCR is automatically programmed to record that show. It's that simple.

Example of "PlusCode"

PlusCode

5:30 M MOVIE—Musical (2hrs.) 33044
2 SPORT—Golf (1hr. 25min.) 42060
CNN—WS 9974
6:30 2 3 4 DRAMA—Comedy (2hrs.) 17390
5 SCIENCE AND TECHNOLOGY (1hr. 15min.) 73457

How to set up your VCR

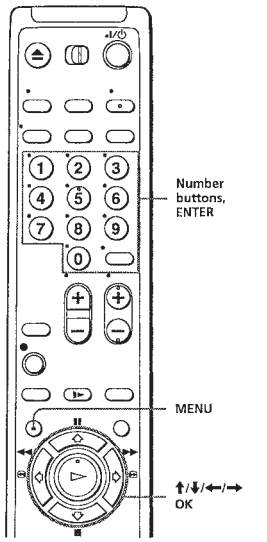
Setting up your VCR involves coordinating the TV channel number (the number you turn to on your TV or VCR to watch a program) with the guide channel (the number that's assigned to that channel in your program guide).

To find the guide channel numbers, look at the "Channel Line-up Chart" in the program guide for your area that features VCR PlusCodes. It usually looks like the example to the right.

To set the guide channels, use the Channel Line-up Chart to check that the guide channel numbers match the TV channel your VCR receives. For example, if HBO is listed in the Channel Line-up Chart on channel 33, and your VCR receives HBO on channel 5, you need to coordinate these numbers using the following procedure. If the guide and TV channel numbers are the same, you can skip this procedure.

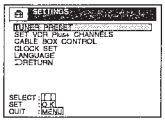
Example of "Channel Line-up Chart"

CABLE CH	CABLE TV	VCR Plus+ GUIDE CH
16	AMC American Movie Classics	35
17	BRV Bravo (program grid only)	54
20	CNN Cable News Network	42
21	CSP C-SPAN	26
22	DIS The Disney Channel	53
25	DSC The Discovery Channel	37
34	ESN ESPN	34
35	FAM The Family Channel	47
5	HBO Home Box Office	33
27	LIF Lifetime	46
29	MAX Cinemax	45
30	MTV Music Television	48
31	NIK Nickelodeon	38
38	SC Sports Channel	59
39	SCA Sports Channel America	70
45	SHO Showtime	41
17	TBS TBS SuperStation	43
44	TMC The Movie Channel	58
49	TNN The Nashville Network	49
50	TNT Turner Network Television	52
51	USA USA Network	44



1 MENU

Press MENU, then press ↑/↓ to highlight SETTINGS and press OK.



2

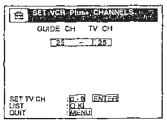
Press ↑/↓ to highlight SET VCR Plus+ CHANNELS, then press OK.

continued

Setting up the VCR Plus+ system (continued)

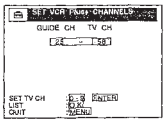
3 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⓪

Enter the guide channel number assigned in the program guide and press ENTER.

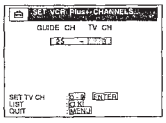


4 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⓪

- If you made Hookup 1, 2 or 3: Enter the actual number on your TV (and VCR) and press ENTER.



- If you made Hookup 4: Enter the cable box output channel (usually 2, 3 or 4) and press ENTER.
- If you made Hookup 6: Enter the actual number on your TV (and VCR) for an unscrambled channel and press ENTER. For a scrambled channel, enter the cable box output channel (usually 2, 3, or 4) and press ENTER.

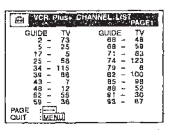


5 Repeat steps 3 and 4 for each channel number that does not match.

6

When you have set all channels, press OK to confirm your channel settings.

To return to the previous page, press ←. To go to the next page, press →.



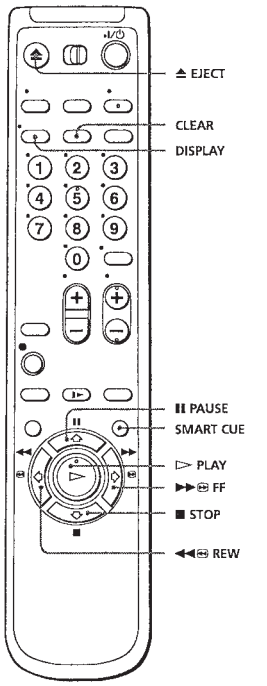
7 MENU

After all settings are complete, press MENU to exit the menu.

Tip

- If you want to return to the previous menu, highlight RETURN and press OK.

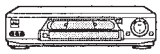
Playing a tape



1 Turn on your TV and set it to the video channel.

continued

2 Insert a tape.



The VCR turns on and starts playing automatically if you insert a tape with its safety tab removed.

3 Press ▷ PLAY.

When the tape reaches the end, it will rewind automatically.

Additional tasks

To	Press
Stop play	■ STOP
Pause play	❚❚ PAUSE
Resume play after pause	❚❚ PAUSE or ▷ PLAY.
Fast-forward the tape	▶▶ FF during stop
Rewind the tape	◀◀ REW during stop
Eject the tape	⏏ EJECT

To skip playback

You can skip a portion of playback you don't want to watch such as a commercial and restart playback by pressing a single button.

1. Press SMART CUE during playback of the scene you want to skip. The VCR starts searching.
2. Press SMART CUE again when you find the scene you want to watch. The VCR stops searching, rewinds a few seconds, then resumes normal playback.

If you press and hold SMART CUE while the VCR is skip searching, the VCR will stop searching, and continue rewinding until you release SMART CUE.

To use the time counter

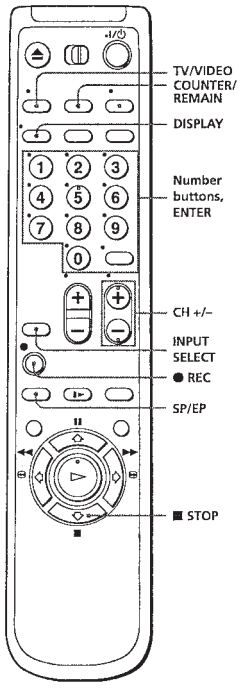
At the point on the tape that you want to find later, press CLEAR. The counter in the display window resets to "0:00:00." Search for the point afterwards by referring to the counter.

To display the counter on the TV screen, press DISPLAY.

Notes

- Tapes recorded in the LP mode on other VCRs can be played back on this VCR but the picture quality cannot be guaranteed.
- While setting the menu on the TV screen, you cannot use ▷ PLAY, ❚❚ PAUSE, ▶▶ FF, ◀◀ REW, or ■ STOP buttons.
- The counter resets to "0:00:00" whenever a tape is reinserted.
- The counter stops counting when it comes to a portion with no recording.

Recording TV programs



1 Turn on your TV and set it to the video channel.

To record from a cable box, turn it on.

2 Insert a tape with its safety tab in place.

3 INPUT SELECT

Press INPUT SELECT until a channel number appears in the display window.

4 • CH

Press CH +/– to select the channel you want to record.

5 SP/EP

Press SP/EP to select the tape speed, SP or EP.

EP (Extended Play) provides recording time three times as long as SP (Standard Play), however, SP produces better picture and audio quality.

6 ●REC

Press ● REC to start recording.

The recording indicator lights up red in the display window.

Recording indicator

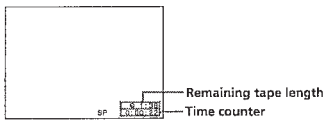
To stop recording

Press ■ STOP.

continued

To check the remaining tape length

Press DISPLAY. The remaining tape length and the time counter appear on the TV screen. Each time you press COUNTER/REMAIN, the time counter and the remaining tape length with the ⏲ indicator appear alternately in the display window.



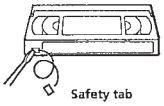
To check the remaining time of a T-140 or T-180 tape, set TAPE SELECT in the ADVANCED OPTIONS menu to 180. (For details, see page 85.)

To watch another TV program while recording

1. Press TV/VIDEO to turn off the VIDEO indicator in the display window.
2. If the TV is connected to the VCR's LINE OUT jacks, set the TV to TV input; if not, skip this step.
3. Select another channel on the TV.

To save a recording

To prevent accidental erasure, break off the safety tab as illustrated. To record on a tape again, cover the tab hole with adhesive tape.



Tips

- To select a channel, you can use the number buttons on the remote commander. Enter the channel number, then press ENTER.
- You can select a video source from the LINE-1 IN or LINE-2 IN jacks using the INPUT SELECT button.
- The display appears on the TV screen indicating information about the tape, but the information won't be recorded on the tape.
- If you don't want to watch TV while recording, you can turn off the TV. When using a cable box, make sure to leave it on.

Notes

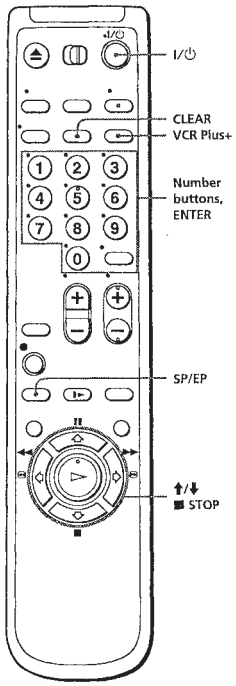
- The remaining tape length may not be indicated accurately for short tapes such as T-20 or T-30, or tapes recorded in the LP mode.
- The display does not appear during still (pause) mode or slow-motion playback.
- It may take up to one minute for the VCR to calculate and display the remaining tape length after you press DISPLAY.

Recording TV programs using the VCR Plus+ system

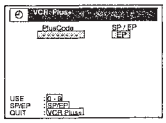
Just enter the PlusCode number listed in the TV program guide. The date, time and channel number of that program are set automatically. You can preset up to eight programs at a time.

Before you start...

- Check that the VCR clock is set to the correct time.
- Turn on your TV and set it to the video channel. When using a cable box, turn it on.
- Insert a tape with its safety tab in place. Make sure the tape is longer than the total recording time.

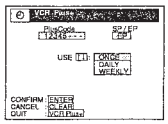


1 VCR Plus+ Press VCR Plus+.

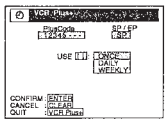


2 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⓪ Press the number buttons to enter the PlusCode number.

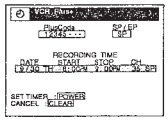
CLEAR If you make a mistake, press CLEAR and re-enter the correct number.



3 SP/EP Press SP/EP to select the tape speed, SP or EP.



4 Press ↑/↓ to highlight ONCE, DAILY, or WEEKLY, then press ENTER:



To record	Select
Only once	ONCE
Everyday Monday to Friday	DAILY
Once a week	WEEKLY

CLEAR The date, start and stop time, channel number and tape speed appear on the TV screen. If the information is not correct, press CLEAR to cancel the setting.

5 To enter another setting, repeat steps 1 to 4.

6 I/⏻ Press I/⏻ to turn off the VCR.

The ⏲ indicator appears in the display window and the VCR stands by for recording. When using a cable box, leave it on.

To stop recording

To stop the VCR while recording, press ■ STOP.

continued

To use the VCR after setting the timer

To use the VCR before a timer recording begins, just press I/⏻. The ⏲ indicator disappears from the display window and the VCR switches on. Remember to press I/⏻ to reset the VCR to the timer recording standby mode after using the VCR.

You can also do the following tasks while the VCR is recording:

- Reset the counter.
- Display tape information on the TV screen.
- Check the timer settings.
- Watch another TV program.

To lock the VCR after setting the timer (Child Lock)

While the VCR turns on, hold down I/⏻ POWER on the VCR until the 🔑 indicator appears in the display window. The VCR turns off and the 🔑 indicator remains lit. The VCR will not work except for timer recording.

To unlock the VCR, hold down I/⏻ POWER on the VCR until the 🔑 indicator disappears from the display window. The VCR is unlocked and turns on.

To stop timer recording while the VCR is locked, press ■ STOP. The recording stops and the VCR is unlocked.

Tips

- To cancel the VCR Plus+ system recording, press VCR Plus+ before pressing ENTER in step 4 above.
- When you are recording a program in the SP mode and the remaining tape becomes shorter than the recording time, the tape speed is automatically changed to the EP mode. Note that some noises will appear on the picture when the tape speed is changed. If you want to keep the tape speed, set AUTO TAPE SPEED to OFF in the ADVANCED OPTIONS menu (page 85).

Notes

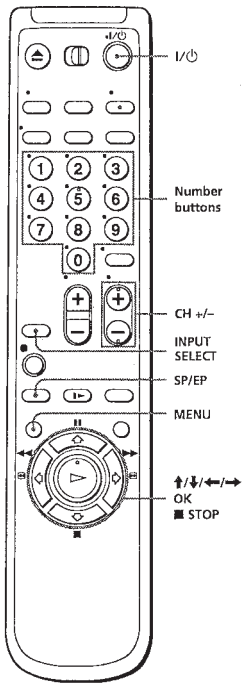
- If the VCR does not accept the PlusCode number, this means that:
  - The PlusCode number is incorrect.
  - ONCE, DAILY, or WEEKLY was selected incorrectly. You cannot select DAILY or WEEKLY for a program that airs more than seven days ahead.
- The VCR will be unlocked when:
  - you stop timer recording by pressing ■ STOP
  - you insert a tape
  - the AC power cord is disconnected or power supply stops.

Setting the timer manually

If the VCR Plus+ system is not available in your area, follow the instructions below to set the timer to record programs.

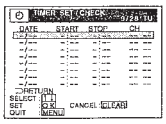
Before you start...

- Check that the VCR clock is set to the correct time.
- Turn on your TV and set it to the video channel. When using a cable box, turn it on.
- Insert a tape with its safety tab in place. Make sure the tape is longer than the total recording time.



1 MENU

Press MENU, then press ↑/↓ to highlight TIMER SET/CHECK and press OK.



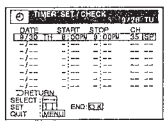
continued

2 Press ↑/↓ to highlight the line that is to be set, then press OK.

3 Set the date, start and stop time, channel number and tape speed:

1 Press ↑/↓ to set each item.
2 Press → to highlight and set each item in turn.

To correct a setting, press ← to return to that setting and reset.



To record the same program every day or the same day every week, press ↓ while the date is highlighting. For details, see "Daily/weekly recording" below.

INPUT SELECT

To record from a source connected to the LINE-1 IN or LINE-2 IN jacks, press INPUT SELECT to display "L1" or "L2" in the "CH" position.

4 Press OK to confirm the setting.

To enter another setting, highlight to the next line and repeat step 3.

5 MENU

Press MENU to exit the menu.

6 I/⏻

Press I/⏻ to turn off the VCR.

The ⏲ indicator appears in the display window and the VCR stands by for recording.
When using a cable box, leave it on.

To stop recording

To stop the VCR while recording, press ■ STOP.

Daily/weekly recording

In step 3 above, press ↓ to select the recording pattern. Each time you press ↓, the indication changes as shown below. Press ↑ to change the indication in reverse order.

the current date → SU-SA → MO-SA → MO-FR → EVERY SA → ..... → EVERY MO → EVERY SU → 1 month later → (dates count down) → the current date

To use the VCR after setting the timer

To use the VCR before a timer recording begins, just press I/⏻. The ⏲ indicator disappears from the display window and the VCR switches on. Remember to press I/⏻ to reset the VCR to the timer recording standby mode after using the VCR.

You can also do the following tasks while the VCR is recording:

- Reset the counter.
- Display tape information on the TV screen.
- Check the timer settings.
- Watch another TV program.

To lock the VCR after setting the timer (Child Lock)

While the VCR turns on, hold down I/⏻ POWER on the VCR until the 🔑 indicator appears in the display window. The VCR turns off and the 🔑 indicator remains lit. The VCR will not work except for timer recording.

To unlock the VCR, hold down I/⏻ POWER on the VCR until the 🔑 indicator disappears from the display window. The VCR is unlocked and turns on.

To stop timer recording while the VCR is locked, press ■ STOP. The recording stops and the VCR is unlocked.

continued

Setting the timer manually (continued)

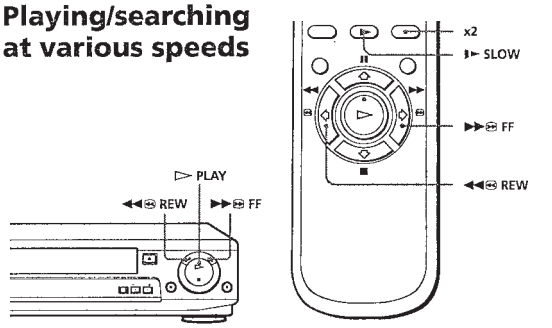
Tips

- To set the channel, you can also use the CH+/– or number buttons.
- To set the tape speed, you can also use the SP/EP button.
- When you are recording a program in the SP mode and the remaining tape becomes shorter than the recording time, the tape speed is automatically changed to the EP mode. Note that some noises will appear on the picture when the tape speed is changed. If you want to keep the tape speed, set AUTO TAPE SPEED to OFF in the ADVANCED OPTIONS menu (page 85).
- If you want to return to the previous menu and continue with other operations after setting the timer, press ↓ to highlight RETURN, then press OK.
  The display returns to the MENU screen.
  If you are finished using the VCR, turn off the power before the timer recording starts.

Note

- If you are using cable box control, you cannot select "L1" or "L2".

Playing/searching at various speeds



Playback options	Operation
View the picture during fast-forward or rewind	During fast-forward, hold down ▶▶ FF. During rewind, hold down ◀◀ REW.
Play at high speed	• During playback, press ▶▶ FF or ◀◀ REW on the remote commander. • During playback, hold down ▶▶ FF or ◀◀ REW. When you release the button, normal playback resumes.
Play at twice the normal speed	During playback, press x2.
Play in slow motion	During playback or pause, press SLOW.
Play frame by frame	During pause, press ▶▶ FF or ◀◀ REW on the remote commander. Hold down the button to play one frame each second.
Rewind and start play	During stop, press PLAY on the VCR while holding down ◀◀ REW on the VCR.

To resume normal playback

Press PLAY.

continued

Playing/searching at various speeds (continued)

Tip

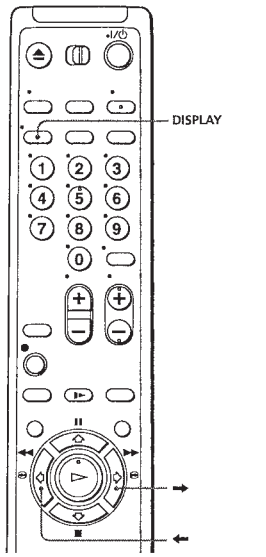
- Adjust the picture using the TRACKING +/– buttons if:
  – Streaks appear while playing in slow motion.
  – The picture shakes while pausing.
  To set tracking to the center position, press both buttons (+/–) at the same time.

Notes

- The sound is muted during these operations.
- Tapes recorded in the LP mode on other VCRs can be played back on this VCR but the picture quality cannot be guaranteed.
- The picture may have snow when playing at high speed in reverse.

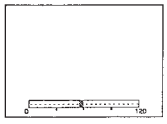
Searching for a selected point on the tape

You can easily find a specific point by moving the pointer on the TV screen. The VCR fast-forwards or rewinds to the point you indicate and starts playback automatically.



1 Press DISPLAY repeatedly until the bar indication appears on the TV screen.

A cursor (■) indicating the current position of the tape appears on the bar indication. If the cursor does not appear, play the tape a few moments (by pressing PLAY, ▶▶ FF, or ◀◀ REW) until the cursor appears.

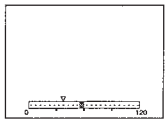


continued

Searching for a selected point on the tape (continued)

2 Press ⬅/➡ to move the pointer (▽) to the point where you want to start playback.

The VCR starts searching and the cursor (■) moves toward the pointer. When the VCR locates the marked point, playback starts.



To cancel searching

Press ▷ PLAY or ■ STOP.

To turn off the bar indication

Press DISPLAY again.

Notes

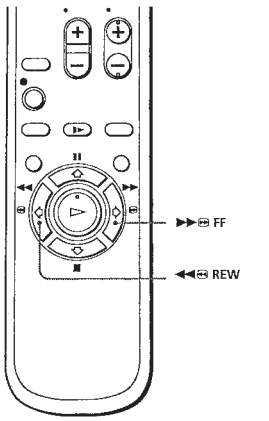
- The figure on the bar indication represents the total time length of the inserted tape as shown below.
  The total time length may not be displayed correctly for:
  – tapes other than T-60, T-120, or T-160
  – tapes recorded in more than one tape speed mode.

Tape type	Total time length		
	SP	LP	EP
T-60 or shorter	60	120	180
from T-80 to T-140	120	240	360
T-160 or longer	160	320	480

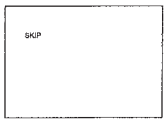
- If you move the pointer (▽) on the bar indication during search, the VCR searches for the new reset point.
- With the bar indication on, the ▶▶⊟ FF/➡ and ◀◀⊟ REW/⬅ buttons on the remote commander work only for moving the pointer (▽), while the ▶▶⊟ FF and ◀◀⊟ REW buttons on the VCR are used for normal tape operation. Note, however, if you press these buttons on the VCR, searching is canceled.

Skip-searching automatically

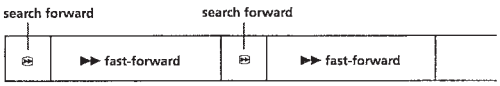
You can spot check a whole tape quickly. At intervals, the VCR skips playback while searching forward or backward.



Hold down ▶▶ ⊟ FF (or ◀◀ ⊟ REW) for more than two seconds during stop. "SKIP" indicator appears on the TV screen.



The VCR searches forward (or backward) for about two minutes on the counter, then fast-forwards (or rewinds) for about ten minutes on the counter. The VCR repeats this operation until it stops at the end (or beginning) of the tape.



To cancel skip-search

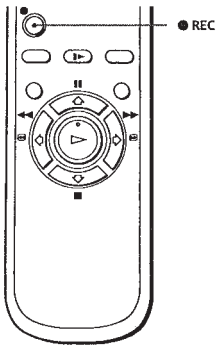
Press ▷ PLAY or ■ STOP.

Note

- The VCR automatically fast-forwards (or rewinds) any portion with no recording.

Setting the recording duration time

After starting recording in the normal way, you can have the VCR stop recording automatically after a specified duration.

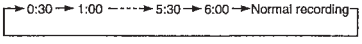


1 While recording, press ● REC.

The ⏲ indicator appears in the display window.

2 Press ● REC repeatedly to set the duration.

Each press advances the time in increments of 30 minutes.



The tape counter decreases minute by minute to 0:00, then the VCR stops recording and turns off automatically.

To extend the duration

Press ● REC repeatedly to set a new duration.

To cancel the duration

Press ● REC repeatedly until ⏲ indicator disappears and the VCR returns to normal recording mode.

To stop while recording

Press ■ STOP.

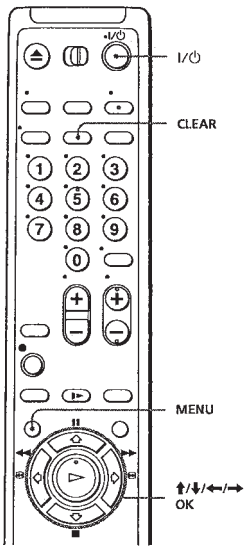
Note

- You cannot display the current tape time in the display window when setting the recording duration.

Checking/ changing/ canceling timer settings

Before you start...

- Turn on your TV and set it to the video channel.



1 Press I/⏻ to turn on the VCR.

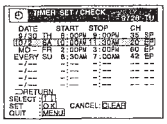
2 Press MENU, then press ↑/↓ to highlight TIMER SET/CHECK and press OK.

- If you want to change a setting, go on to the next step.
- If you do not need to change the settings, press MENU, then turn off the VCR to return to recording standby.

continued

3 Press ↑/↓ to highlight the setting you want to change or cancel.

- To change the setting, press OK and press ←/→ to highlight the item you want to change, then press ↑/↓ to reset it.
- To cancel the setting, press CLEAR.



4 Press OK.

5 Press MENU to exit the menu.

If any timer settings remain, turn off the VCR to return to recording standby.

When the timer settings overlap

The program that starts first has priority and the second program starts recording only after the first program has finished. If the programs start at the same time, the program listed first in the menu has priority.

Recording stereo and bilingual programs

Recording stereo programs

This VCR automatically receives and records stereo programs. When a stereo program is received, the STEREO indicator lights up. If there is noise in the stereo program, set AUTO STEREO in the ADVANCED OPTIONS menu to OFF. The sound will be recorded in monaural (on both hi-fi and normal audio tracks) but with less noise. For details, see page 84.

Recording bilingual programs

Normally, this VCR records only the main sound. When a SAP (Second Audio Program) is received, the SAP indicator lights up. To record only SAP sound, set TUNER AUDIO in the ADVANCED OPTIONS menu to SAP. For details, see page 84.

Selecting the sound during playback

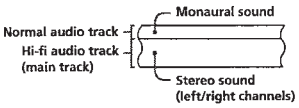
Press AUDIO MONITOR to select the sound you want. (The sound being recorded will not change.)

To listen to	On-screen display	Display window
Stereo	STEREO	STEREO
Left channel	L	STEREO
Right channel	R	STEREO
Monaural sound on the normal audio track	No indicator	No indicator

continued

How sound is recorded on a video tape

The VCR records sound onto two separate tracks. Hi-fi audio is recorded onto the main track along with the picture. Monaural sound is recorded onto the normal audio track along the edge of the tape.



Notes

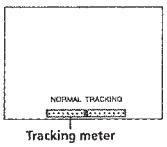
- To play a tape in stereo, you must use the A/V connections.
- When you play a tape recorded in monaural, the sound is heard in monaural regardless of the AUDIO MONITOR setting.

Adjusting the picture

Adjusting the tracking

Although the VCR automatically adjusts the tracking when playing a tape (the ▨ indicator flashes in the display window, then goes off), distortion may occur if the tape was recorded in poor condition. In this case, manually adjust the tracking.

Press TRACKING +/– to display the tracking meter. The distortion should disappear as you press one of the two buttons (the ▨ indicator lights up). To resume automatic tracking adjustment, eject the tape and reinsert it.



Tracking meter

About the Adaptive Picture Control (APC) function

The Adaptive Picture Control (APC) function automatically improves recording and playback quality by adjusting the VCR to the condition of the video heads and tape. To maintain better picture quality, we recommend that you set APC to ON in the ADVANCED OPTIONS menu (with the APC indicator in the display window lit). For details, see page 84.

APC playback

The APC function automatically works on all types of tapes, including rental tapes and tapes that were not recorded with APC.

APC recording

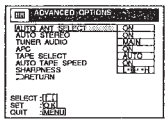
Whenever you insert a tape and first start recording, the VCR adjusts to the tape using the APC function (the APC indicator flashes rapidly). This adjustment is retained until the tape is ejected.

Notes

- The auto tracking adjustment cannot be guaranteed to work with tapes recorded in the LP mode on other VCRs.
- The APC function does not work if the tape speed is automatically changed from the SP to EP mode during a timer recording when AUTO TAPE SPEED is set to ON in the ADVANCED OPTIONS menu, unless the tape has been recorded in the EP mode with the APC function.
- There is a delay of about ten seconds before the VCR actually starts recording while the VCR analyzes the tape. To avoid the delay, first set the VCR to recording pause (the APC indicator flashes slowly) and press ● REC to have the VCR analyze the tape (the APC indicator flashes rapidly). After the APC indicator stops flashing, press ❚❚ PAUSE to start recording immediately.
  If you want to start recording quickly without using the APC function, first set the VCR to recording pause (the APC indicator flashes slowly) and press ❚❚ PAUSE to start recording.

Changing menu options

1 Press MENU, then select ADVANCED OPTIONS and press OK.



2 Press ↑/↓ to highlight the option to change, then press OK.

3 Press ↑/↓ to change the setting, then press OK.
To adjust the sharpness, press ←/→ and press OK.

4 Press MENU to return to the original screen.

Menu choices

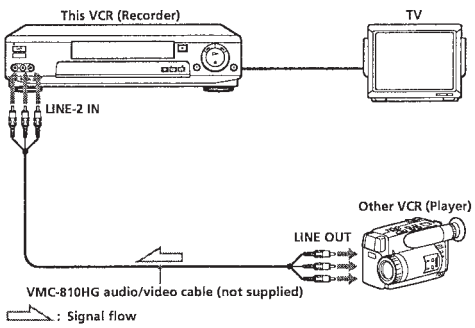
Initial settings are indicated in bold print.

Menu option	Set this option to
AUTO ANT SELECT	• **ON** if your TV is connected only to VHF/UHF OUT on the VCR. To play a tape, set the TV to the VCR channel (channel 3 or 4). • OFF if your TV is connected to both VHF/UHF OUT and LINE OUT on the VCR. To play a tape, set the TV to the VCR input.
AUTO STEREO	• **ON** to receive stereo programs. • OFF to reduce noise. The sound changes to monaural.
TUNER AUDIO	• **MAIN** to record the main sound on both hi-fi and normal audio tracks. • SAP to record the SAP (Second Audio Program) sound on both hi-fi and normal audio tracks.
APC	• **ON** to switch on the APC (Adaptive Picture Control) function and improve picture quality. • OFF to switch off APC.

Menu option	Set this option to
TAPE SELECT	• **AUTO** when using a T-160 length tape or any tape shorter than a T-140 length tape. • 180 when using a T-140 or T-180 length tape. For details, see page 64.
AUTO TAPE SPEED	• **ON** to change the timer recording tape speed automatically to the EP mode when the remaining tape length becomes shorter than the recording time. To operate AUTO TAPE SPEED, set TAPE SELECT correctly. • OFF to keep the tape speed.
SHARPNESS	L (Low) through H (High) to adjust the sharpness of the picture. L to turn off the sharpness control.

Editing with another VCR

How to hook up to record on this VCR



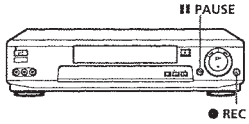
Notes

- Make sure you connect the plugs to jacks of the same color.
- If the other VCR is a monaural type and connected to this VCR's LINE-2 IN jacks, connect the audio plug to the AUDIO L (white) jack. The sound is recorded on both right and left channels. When connecting to the AUDIO R (red) jack, the sound is recorded only on the right channel.
- If you connected this VCR to both the LINE IN and LINE OUT jacks of the other VCR, select the input correctly to prevent a humming noise.
- You can use the LINE-1 IN jacks for editing. If the other VCR is a monaural type, the sound is recorded only on the channel whose jack is connected to the audio plug. To record on both right and left channels, connect the audio plugs to the AUDIO R/L jacks using a VMC-910HG audio/video cable (not supplied).

Operation (when recording on this VCR)

Before you start editing

- Turn on your TV and set it to the video channel.
- Press INPUT SELECT to display "L2" (or "L1") in the display window.
- Press SP/EP to select the tape speed, SP or EP.



1 Insert a source tape with its safety tab removed into the other (playback) VCR. Search for the point to start playback and set it to playback pause.

2 Insert a tape into this (recording) VCR. Search for the point to start recording and press II PAUSE.

3 Press ● REC on this VCR and set it to recording pause.

4 To start editing, press the II PAUSE buttons on both VCRs at the same time.

To stop editing

Press the ■ STOP buttons on both VCRs.

Tip

- To cut out unwanted scenes while editing, press II PAUSE on this VCR when an unwanted scene begins. When it ends, press II PAUSE again to resume recording.

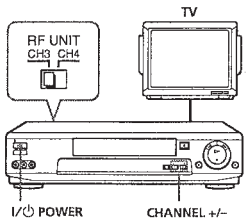
Note

- If you start recording following the procedure above, the VCR won't start recording with the APC function. To record a tape with the APC function, press ● REC again during recording pause in step 3 so that the VCR analyzes the tape. Then when you start recording in step 4, press II PAUSE immediately after the APC indicator stops flashing. If you press II PAUSE before the APC indicator stops flashing, the APC function is canceled.

General setup information

Setting the RF unit

When connecting the VCR to the TV using only the antenna cable, you must set the RF UNIT switch on the rear of the VCR so that the TV can receive the correct signal from the VCR.



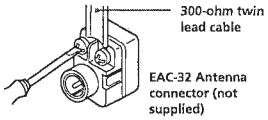
1 Set the RF UNIT switch on the rear of the VCR to CH3 or CH4, whichever channel is not used in your area. If both are used, set the switch to either channel.
2 Press I/⏻ POWER to turn on the VCR.
3 Press TV/VIDEO to turn on the VIDEO indicator in the VCR's display window.
4 Press CH +/– to display a channel number in the display window. Select an active channel number in your area.
5 Turn on your TV and set it to the channel you selected in step 1 (channel 3 or 4).

The channel you selected in step 4 appears on the TV screen. If the channels change when you press CH +/–, you have made the correct setting.

Whenever you use the VCR, set the TV to the channel selected in step 1.

Attaching the external antenna connector

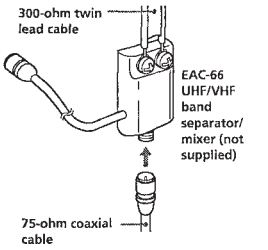
When using a 300-ohm twin lead cable for VHF/UHF antenna, use the EAC-32 antenna connector (not supplied) to connect the antenna to the VCR.



1 Loosen the screws on the antenna connector.
2 Wind the twin leads around the screws on the antenna connector.
3 Retighten the screws.

Attaching a UHF/VHF band mixer

When using both 75-ohm coaxial cable and 300-ohm twin lead cable for VHF/UHF antenna, use the EAC-66 UHF/VHF band separator/mixer (not supplied) to connect the antenna to the VCR.

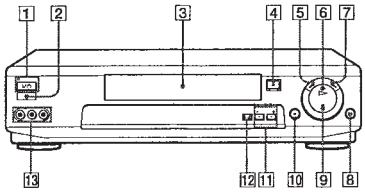


1 Loosen the screws on the mixer.
2 Wind the twin leads around the screws on the mixer.
3 Retighten the screws.
4 Connect the 75-ohm coaxial cable to the mixer.

Index to parts and controls

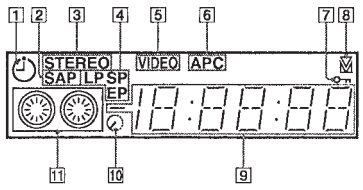
Refer to the pages indicated in parentheses ( ) for details.

Front panel



1 I/⏻ POWER switch/indicator (67)
2 Remote sensor (5)
3 Tape compartment
4 ⏏ EJECT button (60)
5 ◀◀ REW (rewind) button (60, 73)
6 ▷ PLAY button (60, 73)
7 ▶▶ FF (fast-forward) button (60, 73)
8 ● REC (record) button (63, 78, 87)
9 ■ STOP button (60, 87)
10 ❚❚ PAUSE button (60, 87)
11 CHANNEL/TRACKING +/– buttons (63, 83)
12 EASY SET UP button (12, 16, 20, 24, 28, 31)
13 LINE-2 IN VIDEO/AUDIO L/R jacks (86)

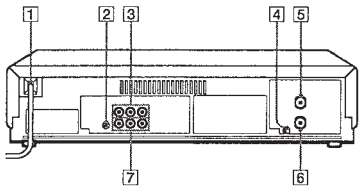
Display window



1 Timer indicator (67, 70)
2 SAP (Second Audio Program) indicator (81)
3 STEREO indicator (81)
4 Tape speed indicator (63)
5 VIDEO indicator (64, 88)
6 APC (Adaptive Picture Control) indicator (83)
7 Child Lock indicator (68)
8 Tracking indicator (83)
9 Time counter/clock/line/channel indicator (61, 63, 87)
10 Remaining time indicator (64)
11 Tape/recording indicator (63)

continued

Rear panel



1 AC power cord (8)

2 CABLE BOX CONTROL (CONTROL S OUT) jack (11, 27)

3 LINE-1 IN AUDIO R/L/VIDEO jacks (27, 86)

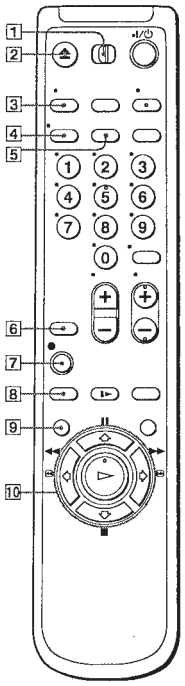
4 RF (Radio Frequency) UNIT switch (88)

5 VHF/UHF IN connector (11, 15, 19, 23, 27, 30)

6 VHF/UHF OUT connector (11, 15, 19, 23, 27, 30)

7 LINE OUT AUDIO R/L/VIDEO jacks (9)

Remote commander



1 TV/VIDEO switch (5)

2 ⏏ EJECT button (60)

3 TV/VIDEO button (6, 64)

4 DISPLAY button (64, 75)

5 CLEAR button (61, 67, 80)

6 INPUT SELECT button (63, 65, 87)

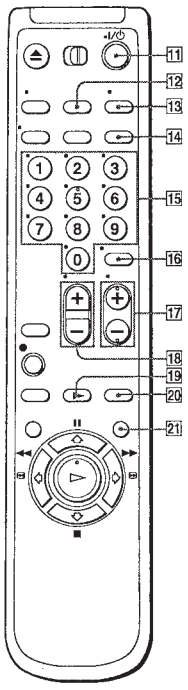
7 ● REC (record) button (63, 78)

8 SP (Standard Play)/EP (Extended Play) button (63)

9 MENU button (35, 69, 79)

10 ❚❚ PAUSE/↑ button (35, 60)
■ STOP/↓ button (35, 60)
◀◀ REW (rewind)/← button (60, 73)
▶▶ FF (fast-forward)/→ button (60, 73)
▷ PLAY/OK button (35, 60)

continued



11 I/⏻ (power) switch (6, 67)

12 COUNTER/REMAIN button (64)

13 AUDIO MONITOR button (81)

14 VCR Plus+ button (66)

15 Number buttons (67)

16 ENTER button (67)

17 CH (channel) +/– buttons (6, 63)

18 VOL (volume) +/– buttons (6)

19 ▮► SLOW button (73)

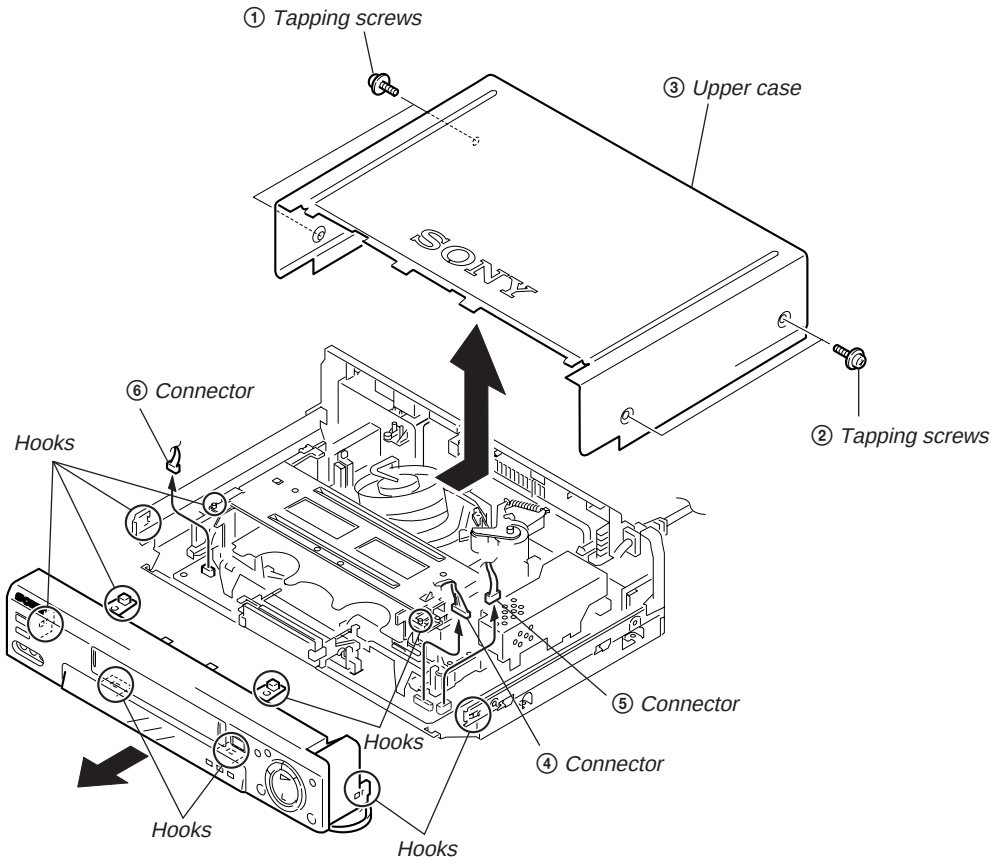
20 x2 button (73)

21 SMART CUE button (60)

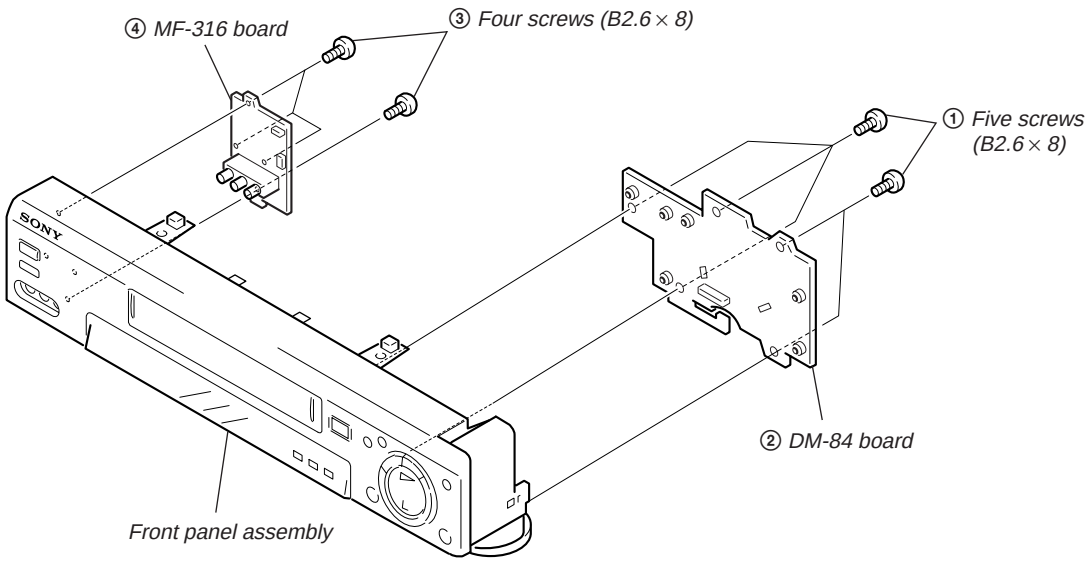
SECTION 2
DISASSEMBLY

NOTE: Follow the disassembly procedure in the numerical order given.

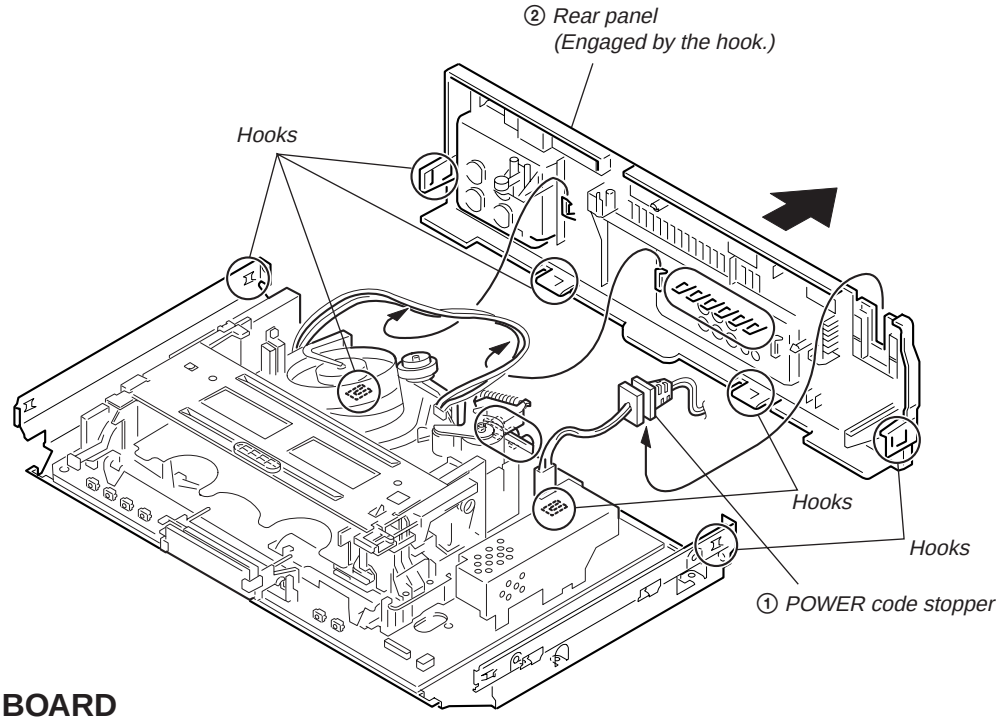
2-1. CASE, FRONT PANEL BLOCK ASSEMBLY



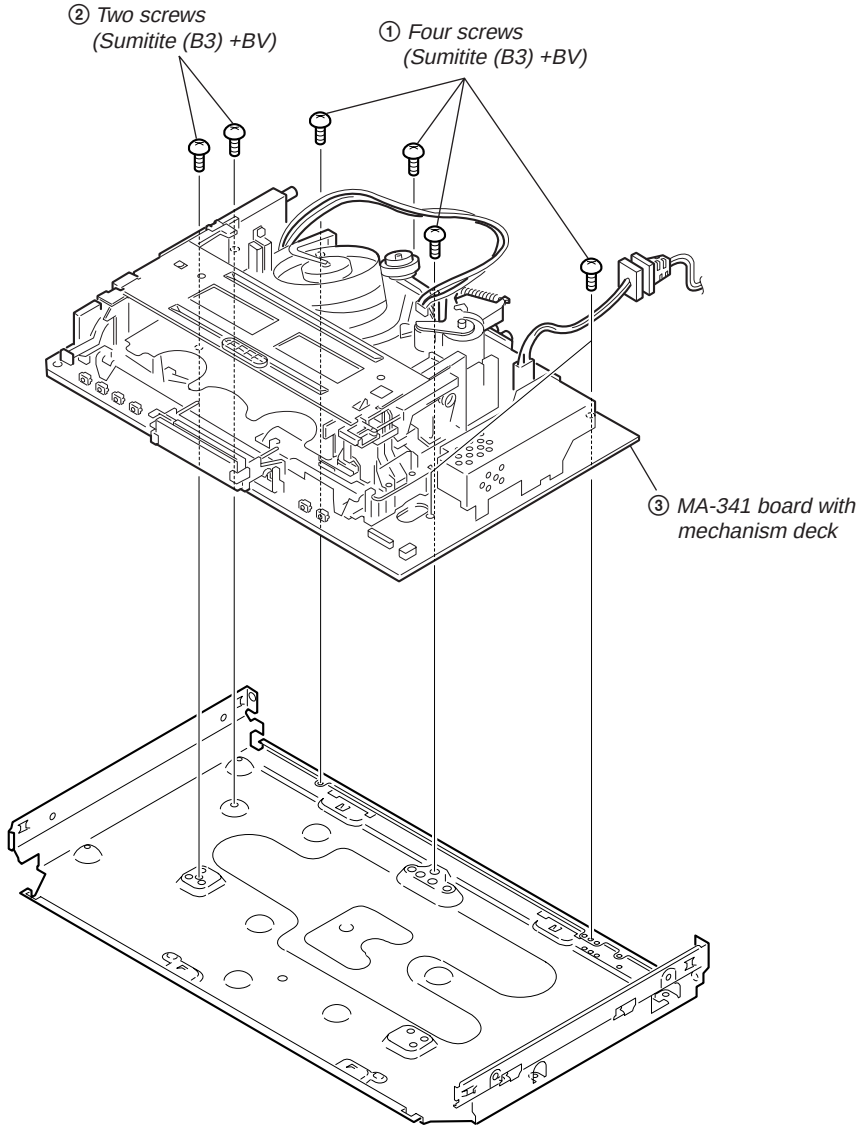
2-2. MF-316 BOARD, DM-84 BOARD



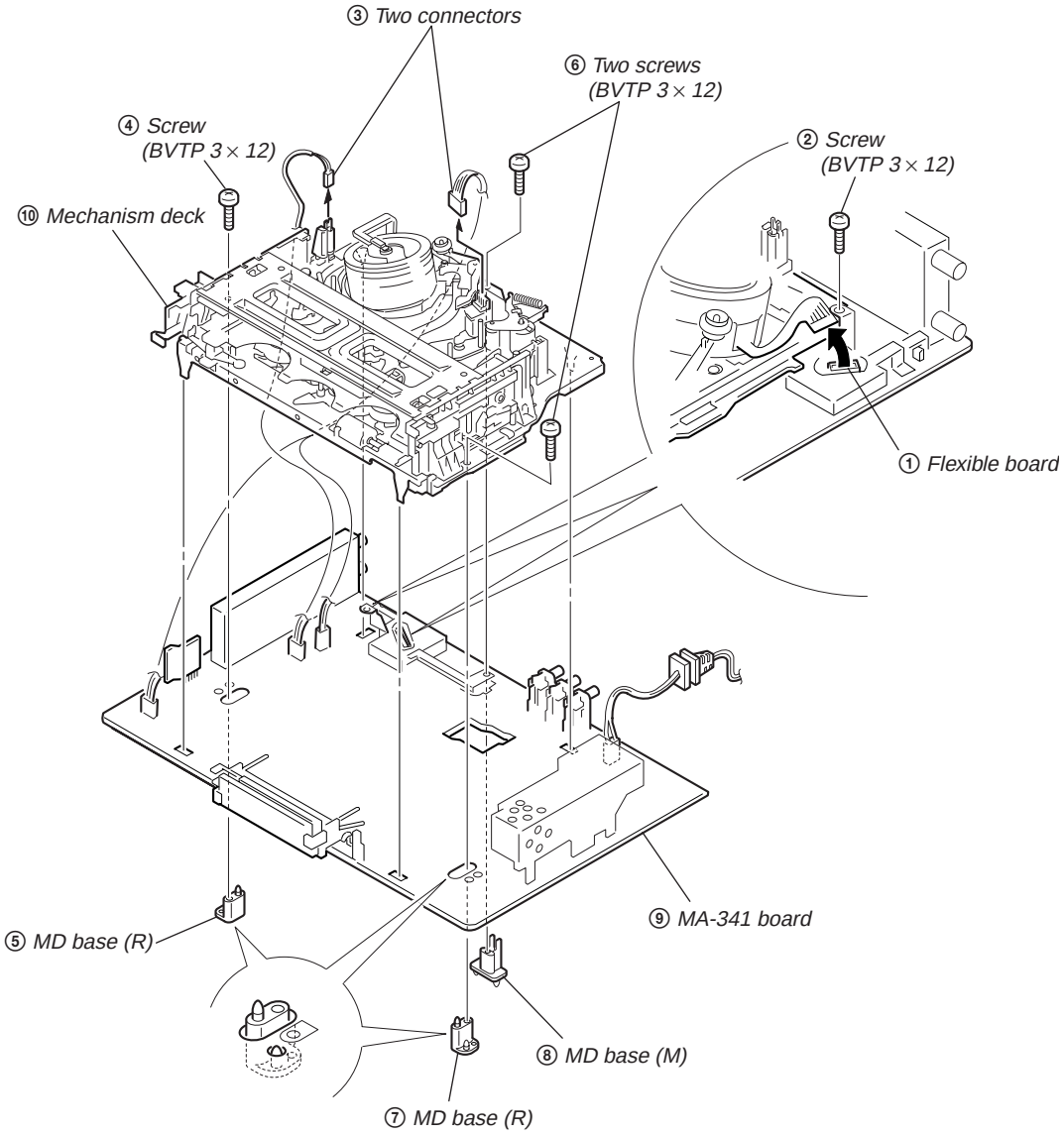
2-3. REAR PANEL



2-4. MA-341 BOARD

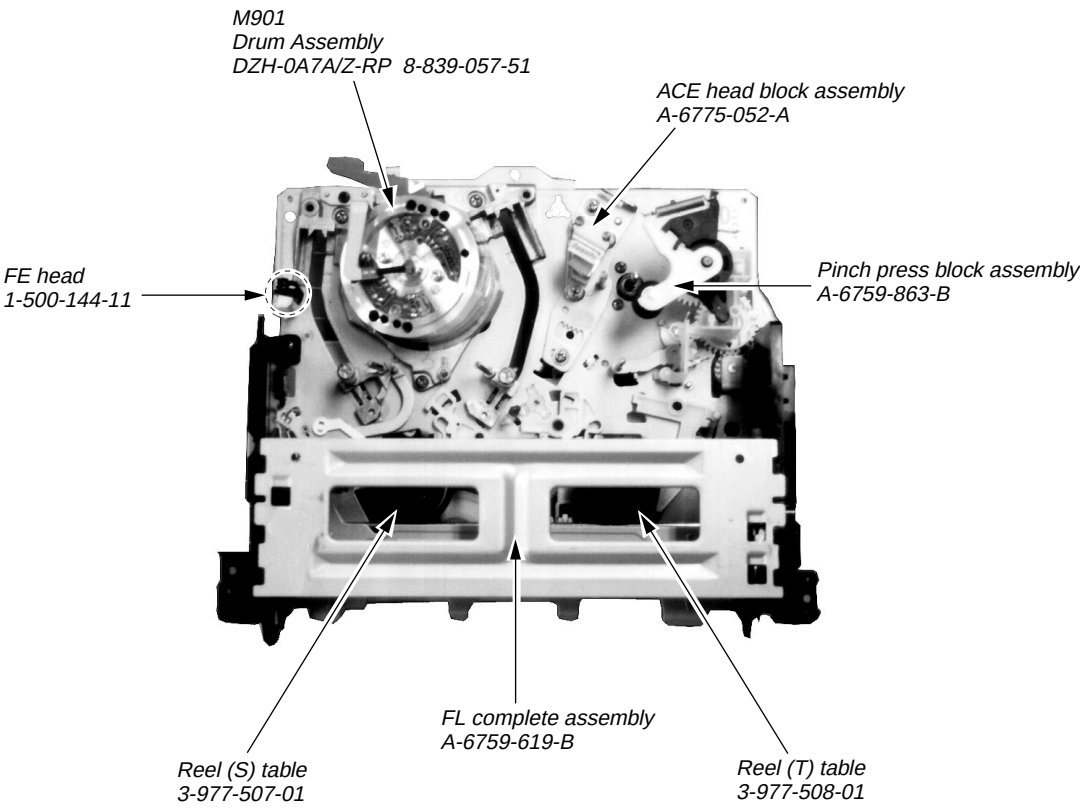


2-5. MECHANISM DECK

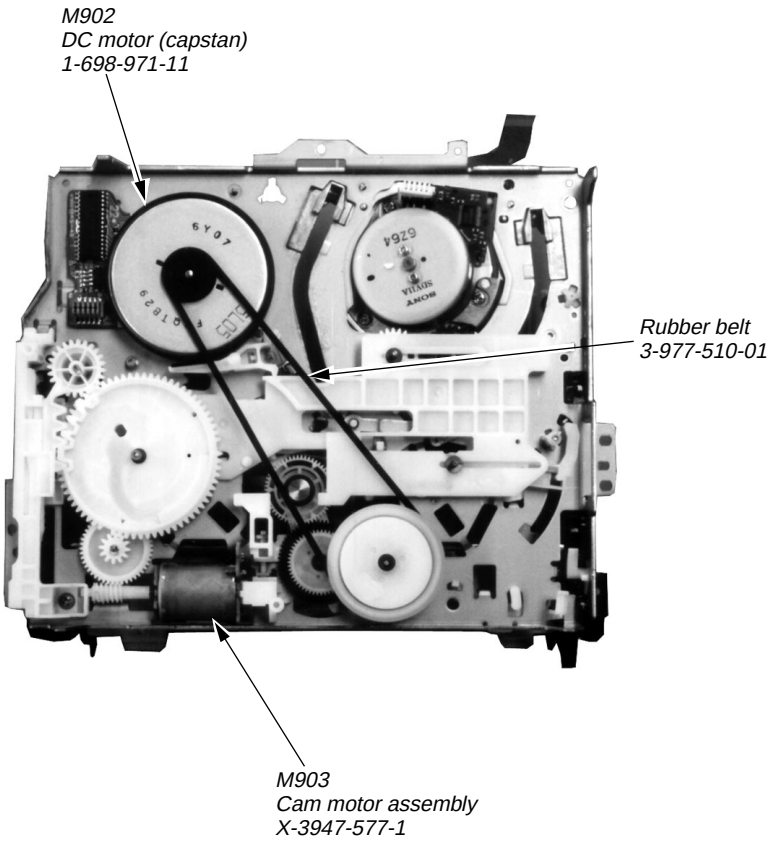


2-6. INTERNAL VIEWS

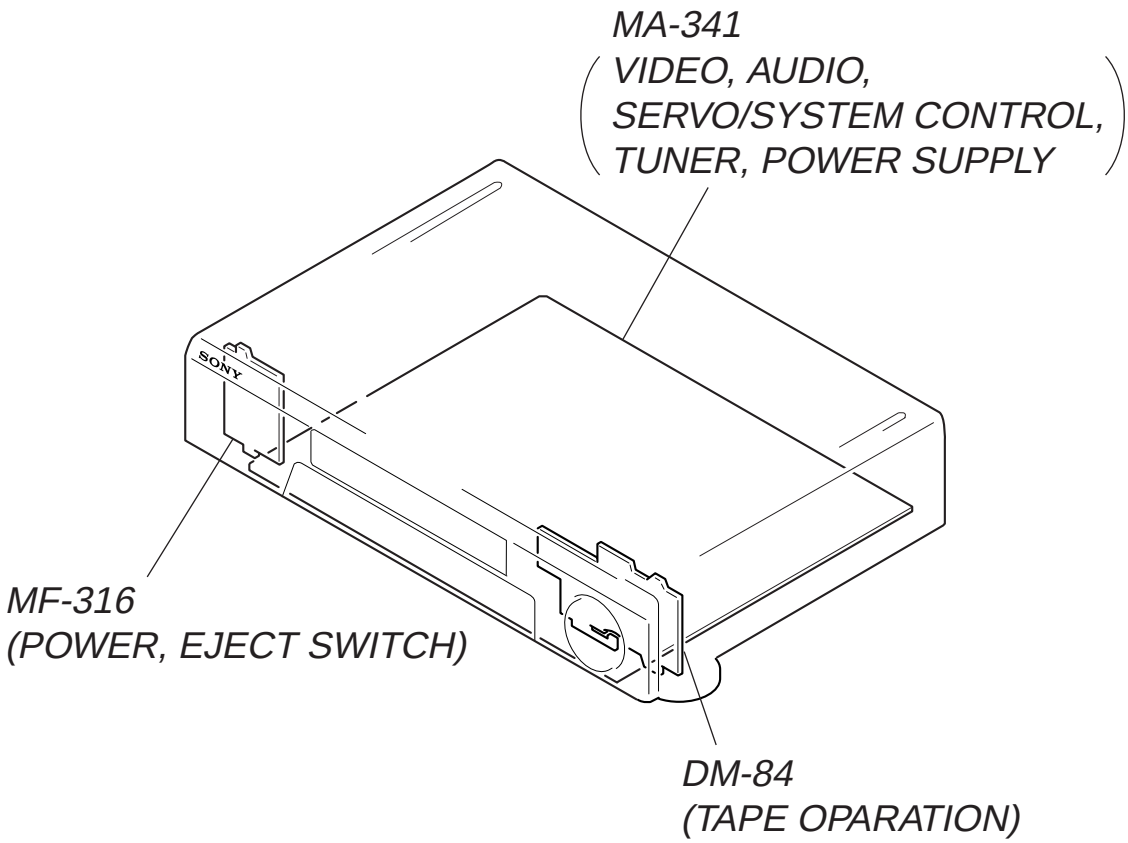
— Top View —



— Bottom View —

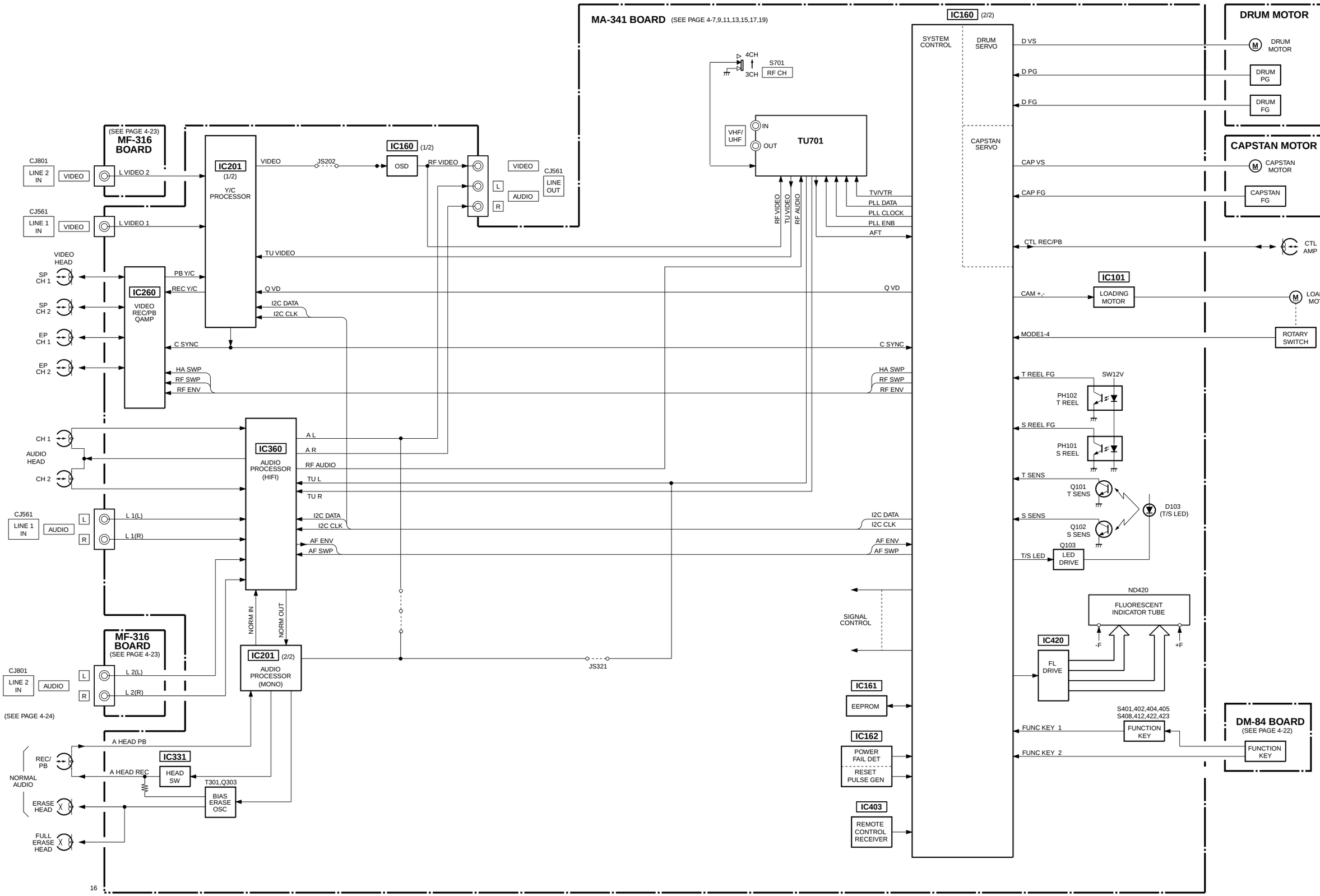


2-7. CIRCUIT BOARDS LOCATION

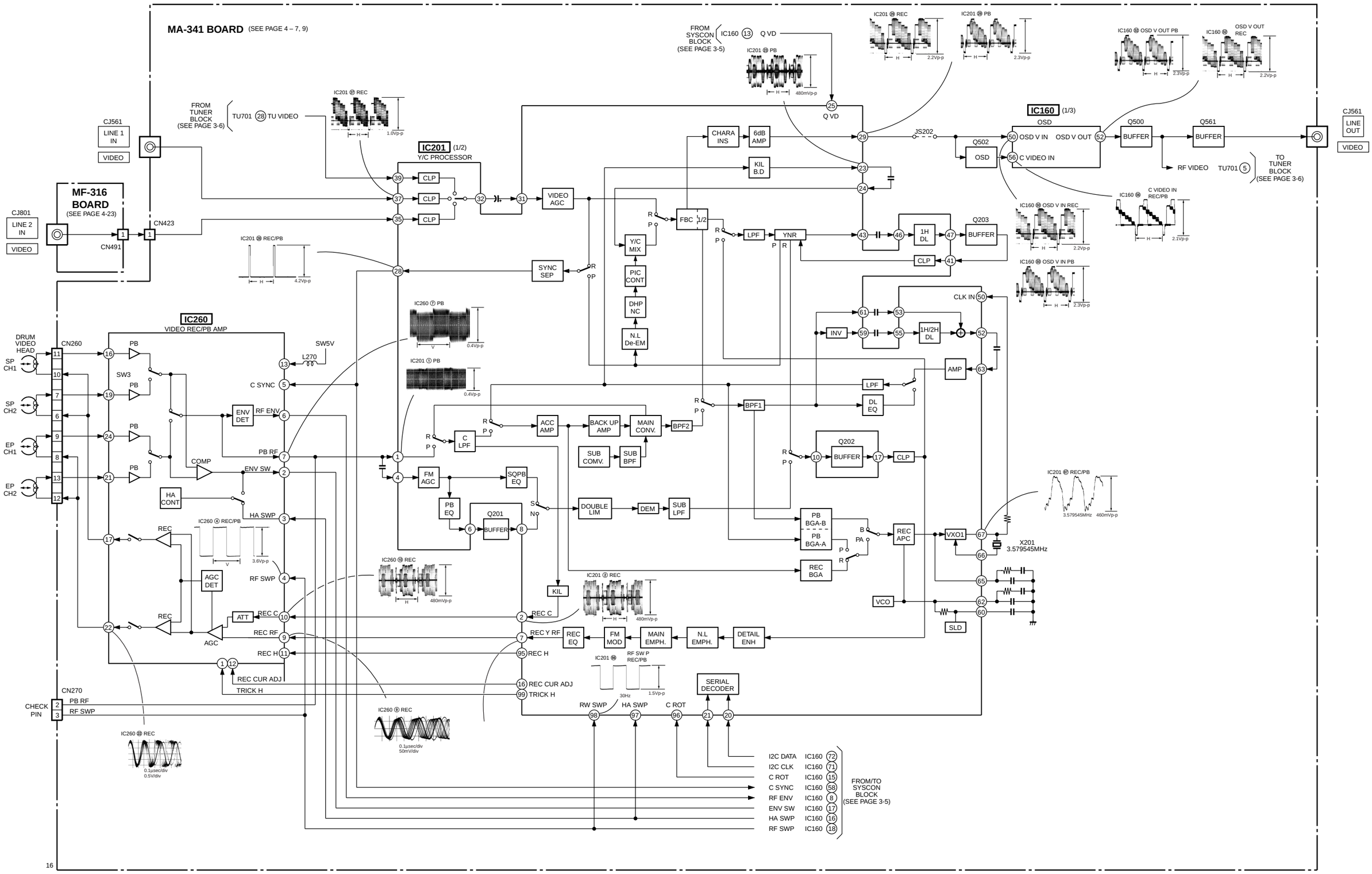


SECTION 3
BLOCK DIAGRAMS

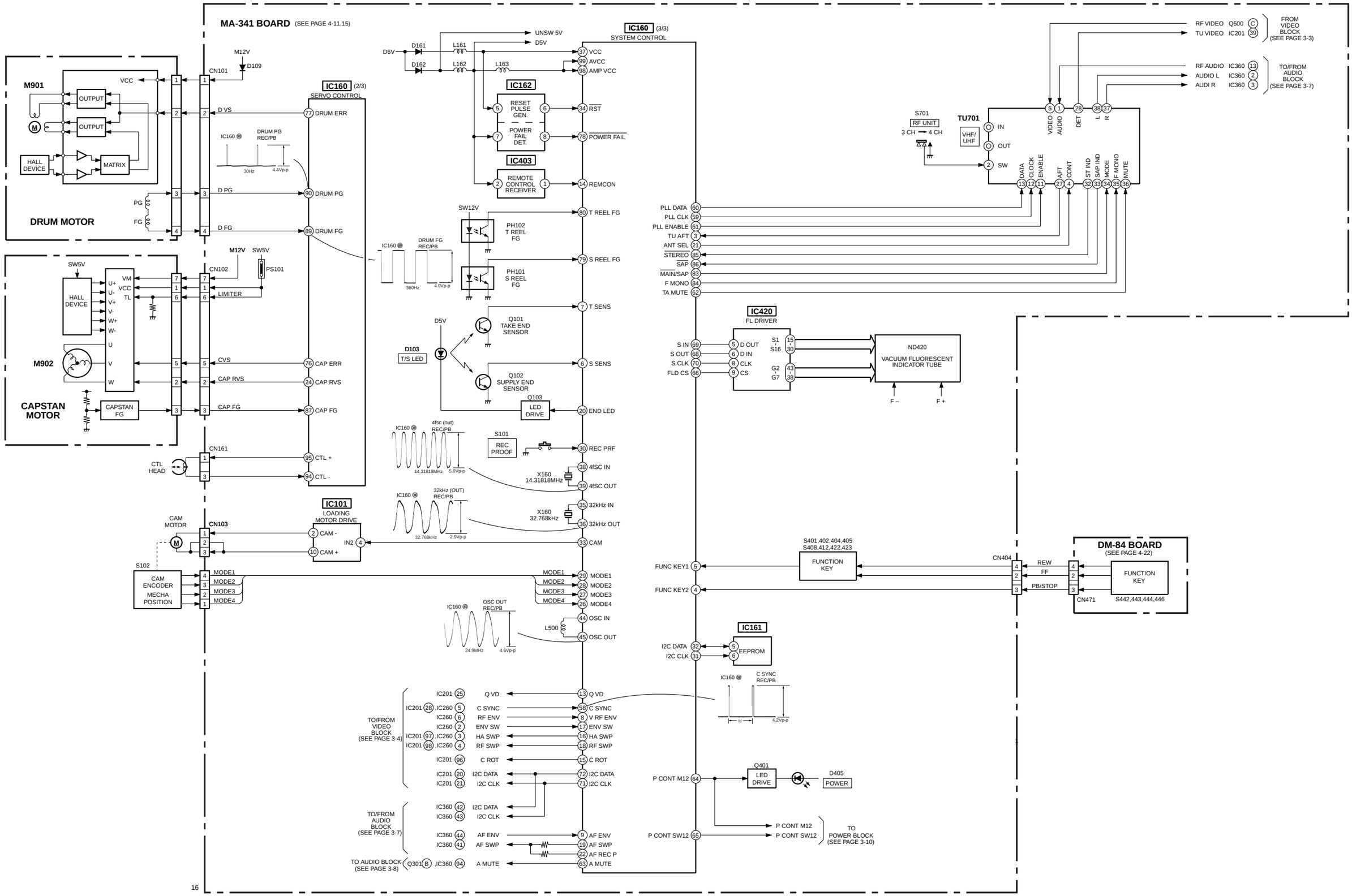
3-1. OVERALL BLOCK DIAGRAM



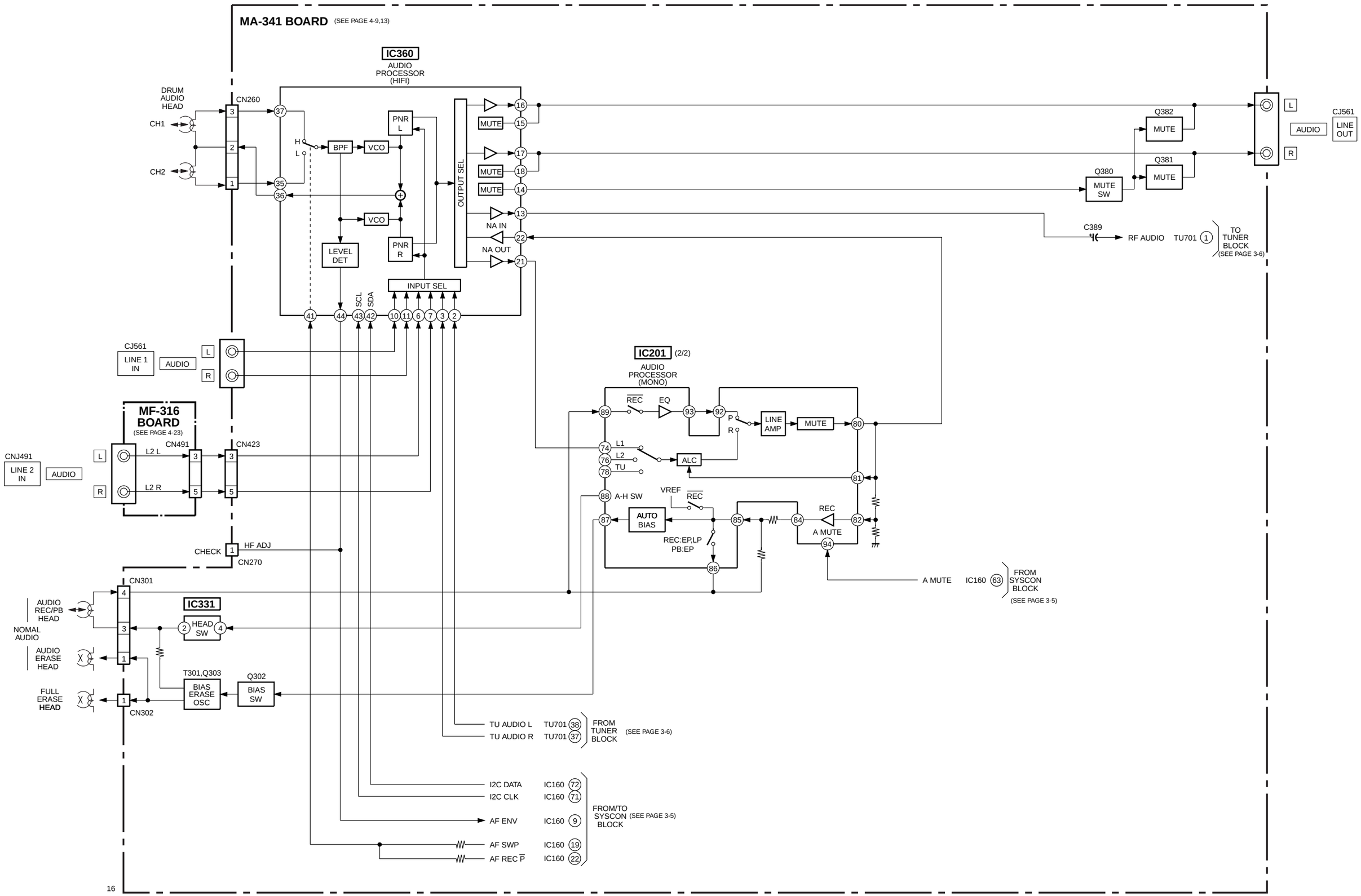
3-2. VIDEO BLOCK DIAGRAM



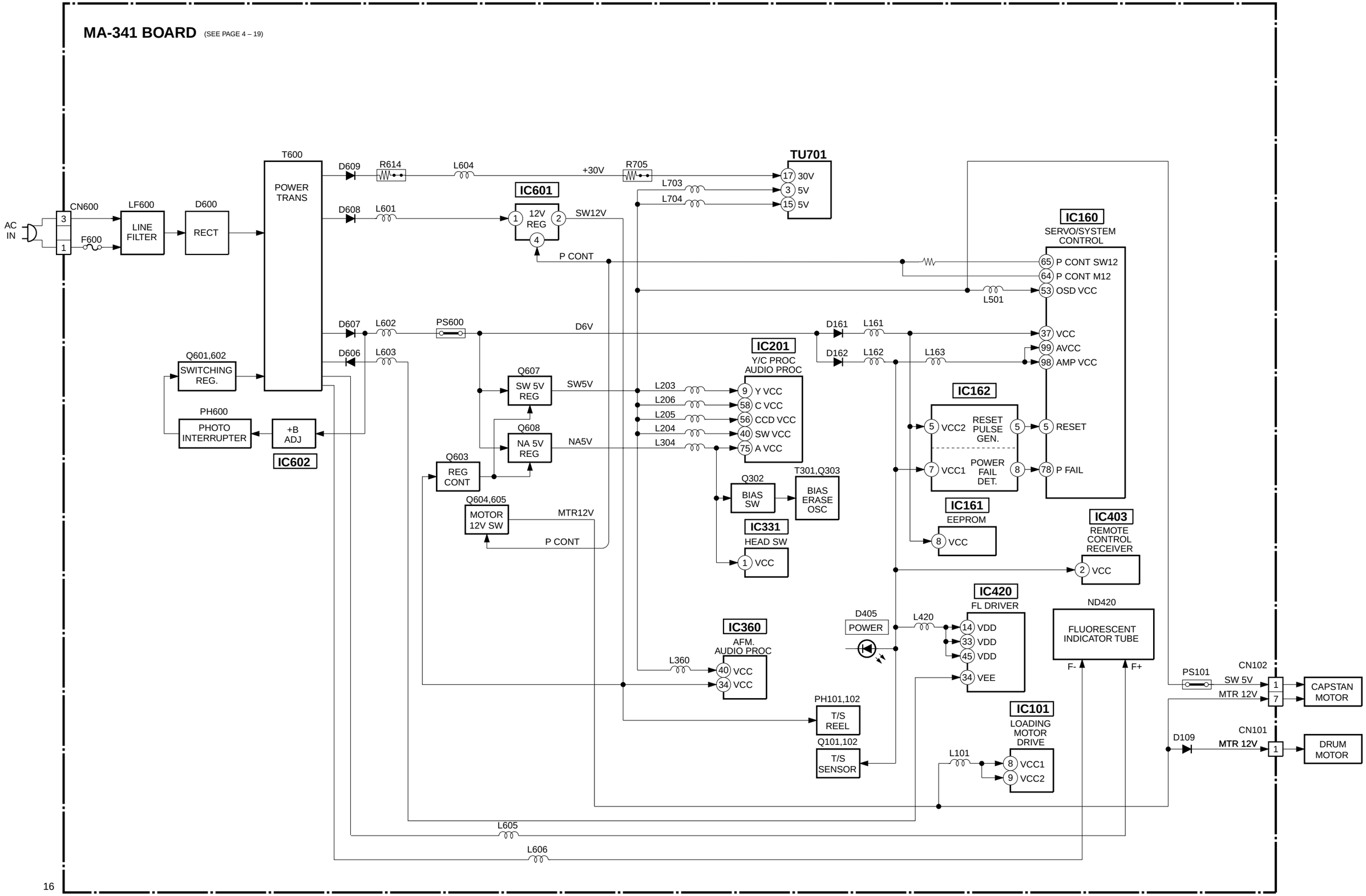
3-3. SERVO/SYSTEM CONTROL/TUNER BLOCK DIAGRAM



3-4. AUDIO BLOCK DIAGRAM



3-5. POWER BLOCK DIAGRAM

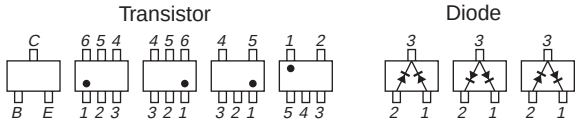


SECTION 4
PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

THIS NOTE IS COMMON FOR PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS.
(In addition to this, the necessary note is printed in each block.)

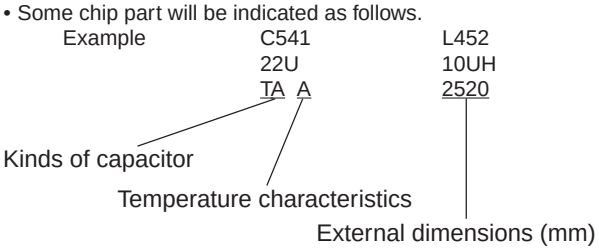
(For printed wiring boards)

- ▒▒▒▒: Pattern from the side which enables seeing.
  (The other layers' patterns are not indicated.)
- Through hole is omitted.
- Circled numbers refer to waveforms.
- There are few cases that the part printed on diagram isn't mounted in this model.
- Chip parts.



(For schematic diagrams)

- All capacitors are in μF unless otherwise noted. pF : μμF. 50V or less are not indicated except for electrolytics and tantalums.
- Chip resistors are 1/10W unless otherwise noted.
  kΩ=1000Ω, MΩ=1000kΩ.
- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, Because it is damaged by the heat.
- Some chip part will be indicated as follows.

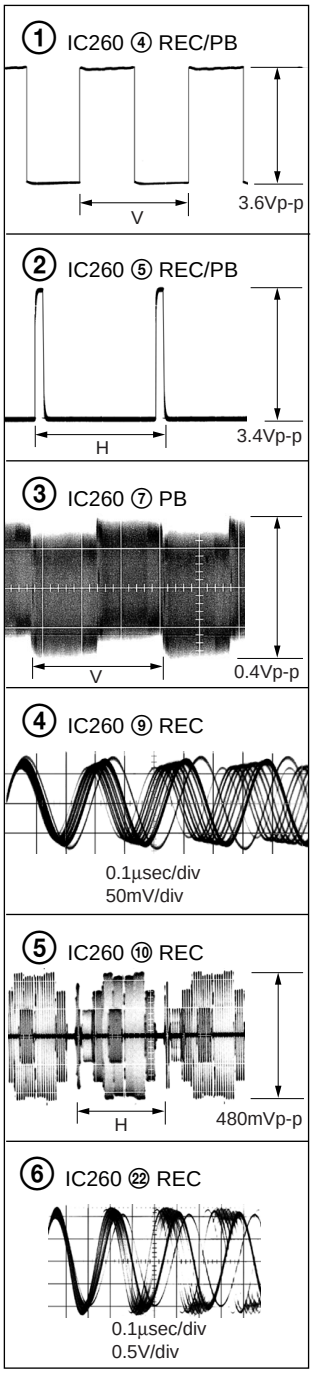


- Constants of resistors, capacitors, ICs and etc with XX indicate that they are not used.
  In such cases, the unused circuits may be indicated.
- Parts with ★ differ according to the model/destination.
  Refer to the mount table for each function.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- Signal name
  XEDIT → $\overline{\text{EDIT}}$ PB/XREC → PB/$\overline{\text{REC}}$
- : non flammable resistor
- : fusible resistor
- : panel designation
- △ : internal component.
- B + : B+ Line.
- B − : B– Line.
- Circled numbers refer to waveforms.
- Readings are taken with a color-bar signal input.
- Voltage are dc between ground and measurement points.
- Readings are taken with a digital multimeter (DC10MΩ).
- Voltage variations may be noted due to normal production tolerances.
- : adjustment for repair.
- Circled numbers refer to waveforms.

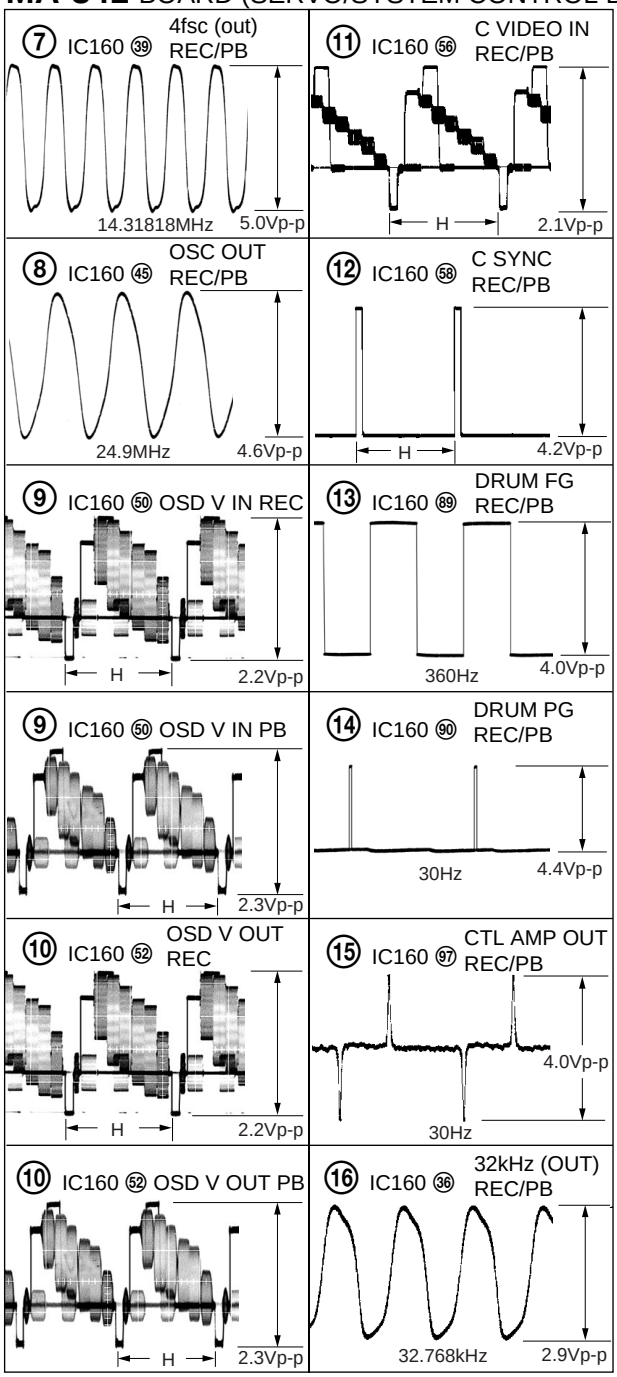
When indicating parts by reference number, please include the board name.

Note :	**Note :**
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

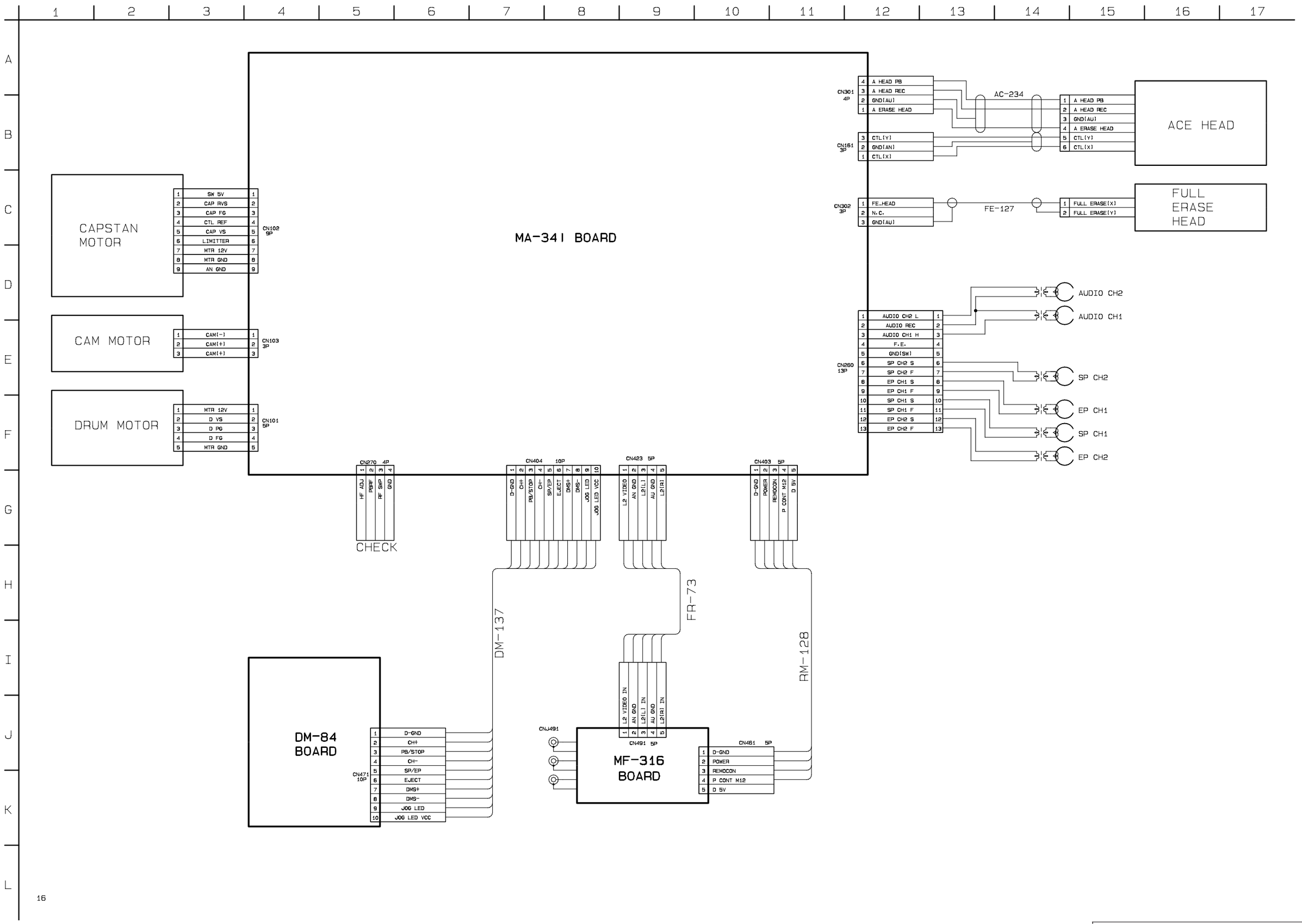
MA-341 BOARD (VIDEO BLOCK (IC260))



MA-341 BOARD (SERVO/SYSTEM CONTROL BLOCK)



4-1. FRAME SCHEMATIC DIAGRAM



16

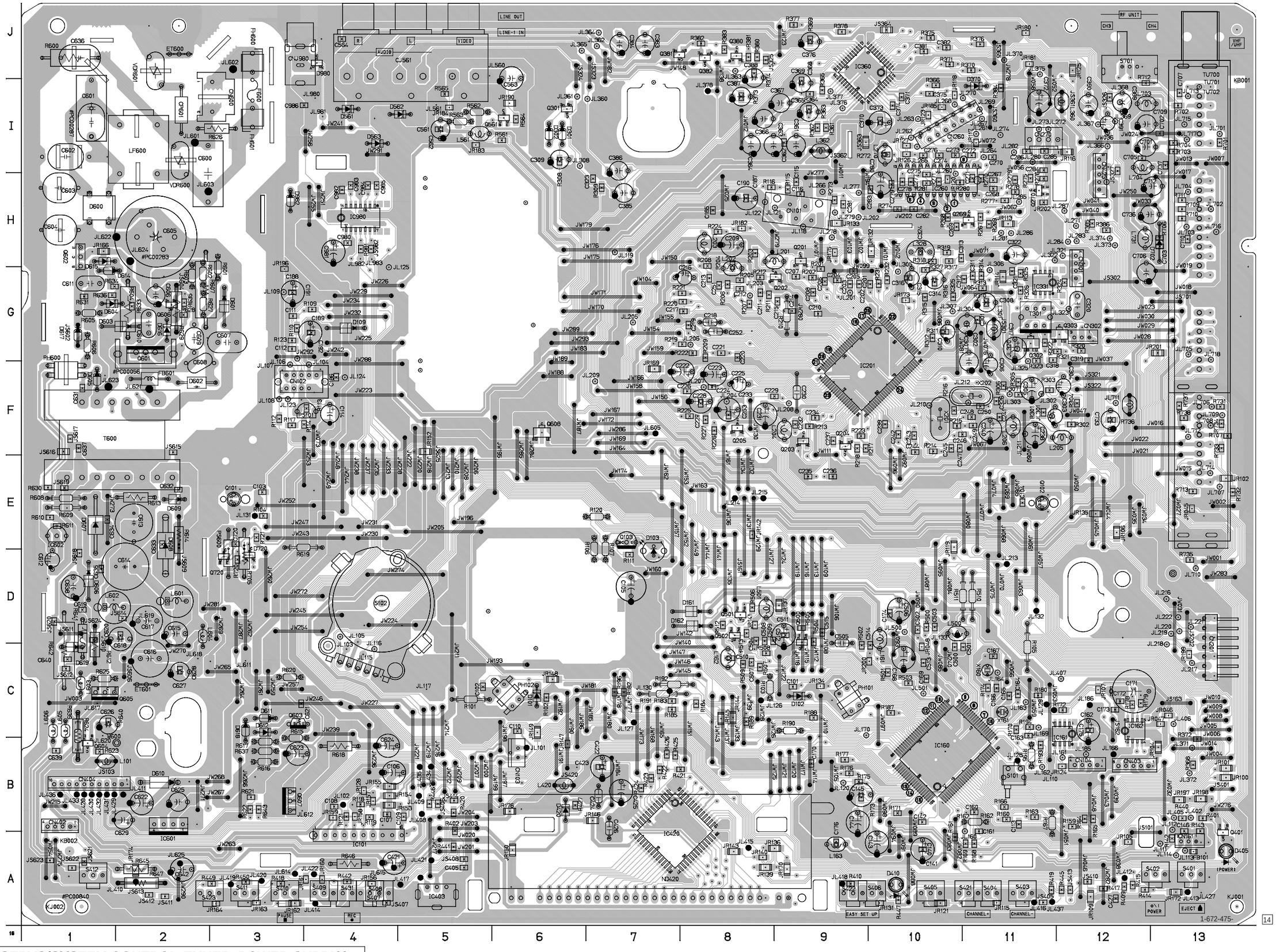
4-2. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

MA-341 (VUDEO, AUDIO, SERVO/SYSTEM CONTROL, TUNER, POWER SUPPLY) PRINTED WIRING BOARD

— Ref. No. MA-341 Board; 1,000 Series —

There are few cases that the part printed on this diagram isn't mounted in this model.

MA-341 BOARD

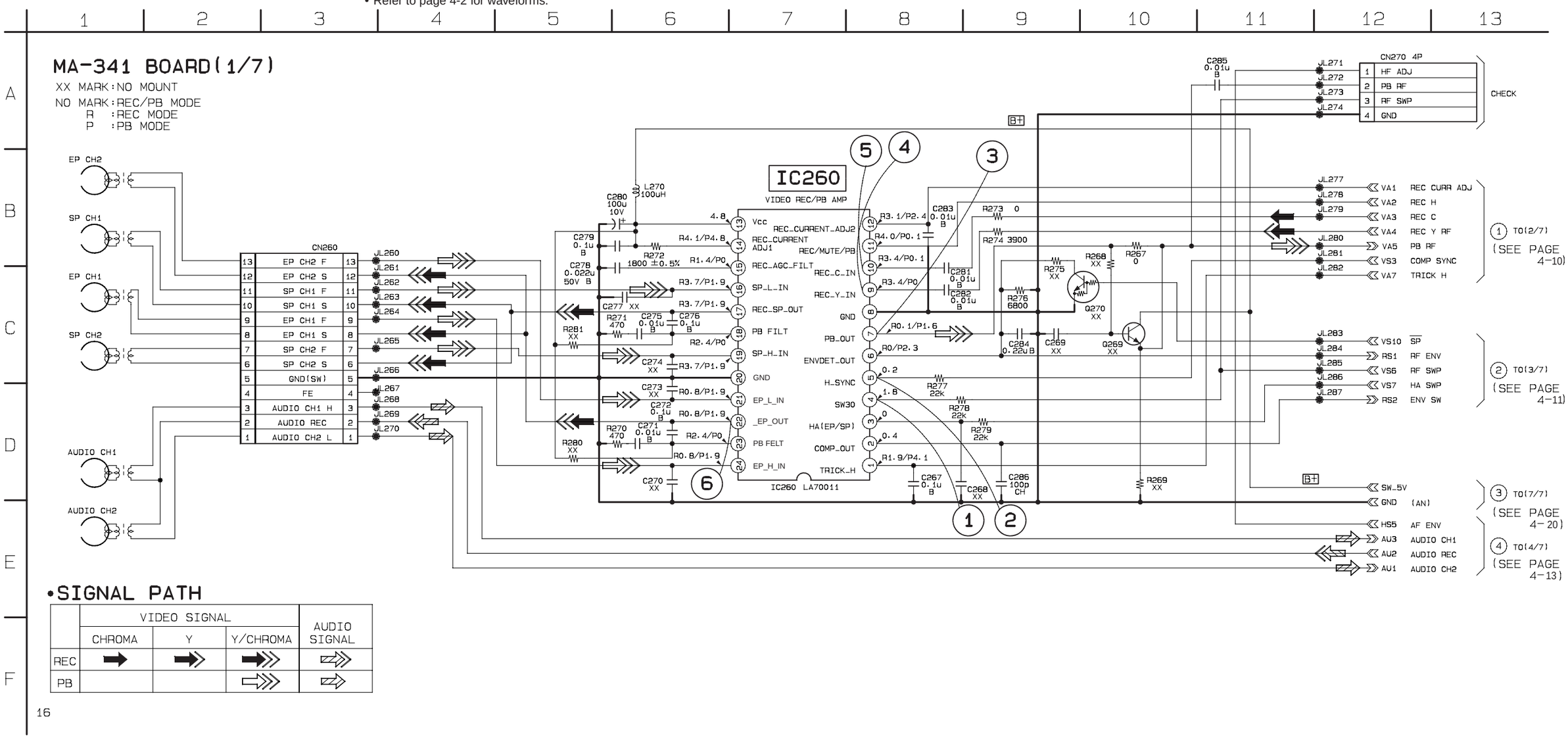


VIDEO, AUDIO, SERVO/SYSTEM CONTROL, TUNER, POWER SUPPLY

MA-341

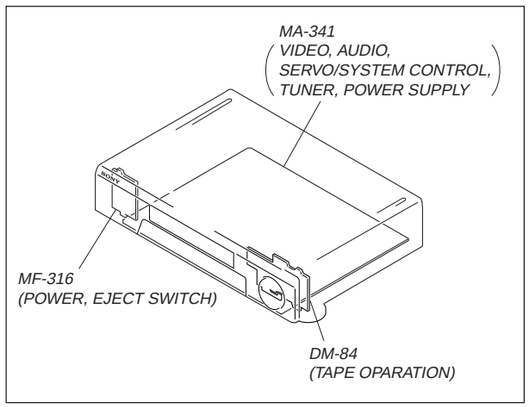
MA-341 (1/7) (VIDEO) SCHEMATIC DIAGRAM
— Ref. No. MA-341 Board; 1,000 Series —

For schematic diagram
- Refer to page 4-5 for printed wiring board.
- Refer to page 4-2 for waveforms.



MA-341 BOARD

CN101	H-9	D605	F-1	PH101	C-9
CN102	F-3	D606	D-1	PH102	C-6
CN103	B-6	D607	E-1	PH600	F-1
CN104	B-12	D608	E-2		
CN161	A-13	D609	E-2	Q101	E-3
CN260	I-10	D610	B-2	Q102	E-11
CN270	I-11	D611	C-3	Q103	E-7
CN301	G-12	D612	C-3	Q201	H-9
CN302	G-12	D618	C-3	Q202	G-8
CN403	B-12	D619	C-1	Q203	F-9
CN404	B-1	D702	H-13	Q302	G-11
CN423	I-12			Q303	G-12
CN600	I-3	IC101	A-4	Q380	J-8
		IC160	C-10	Q381	J-7
D103	D-7	IC161	C-12	Q382	J-8
D109	G-4	IC162	C-12	Q500	C-9
D161	D-8	IC201	F-10	Q502	C-8
D162	D-8	IC260	H-10	Q561	I-6
D420	B-6	IC331	G-11	Q601	G-2
D561	I-4	IC360	J-9	Q602	H-1
D600	H-1	IC420	A-7	Q603	C-3
D601	G-3	IC601	B-2	Q604	B-1
D602	F-2	IC602	E-1	Q605	C-1
D603	G-2	IC980	H-4	Q607	B-3
D604	G-2			Q608	F-6

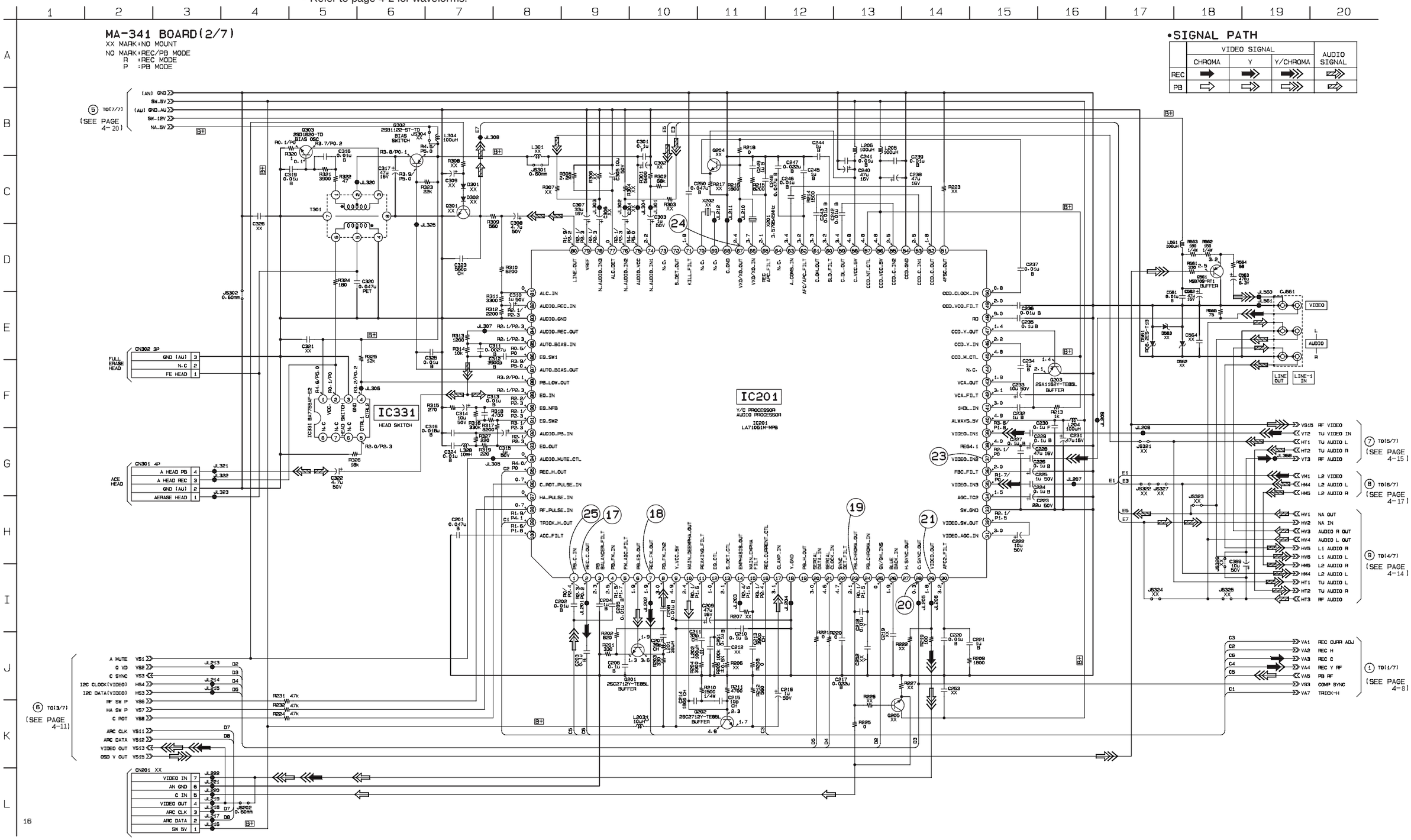


MA-341 (2/7) (AUDIO) SCHEMATIC DIAGRAM

— Ref. No. MA-341 Board; 1,000 Series —

For schematic diagram

- Refer to page 4-5 for printed wiring board.
- Refer to page 4-2 for waveforms.

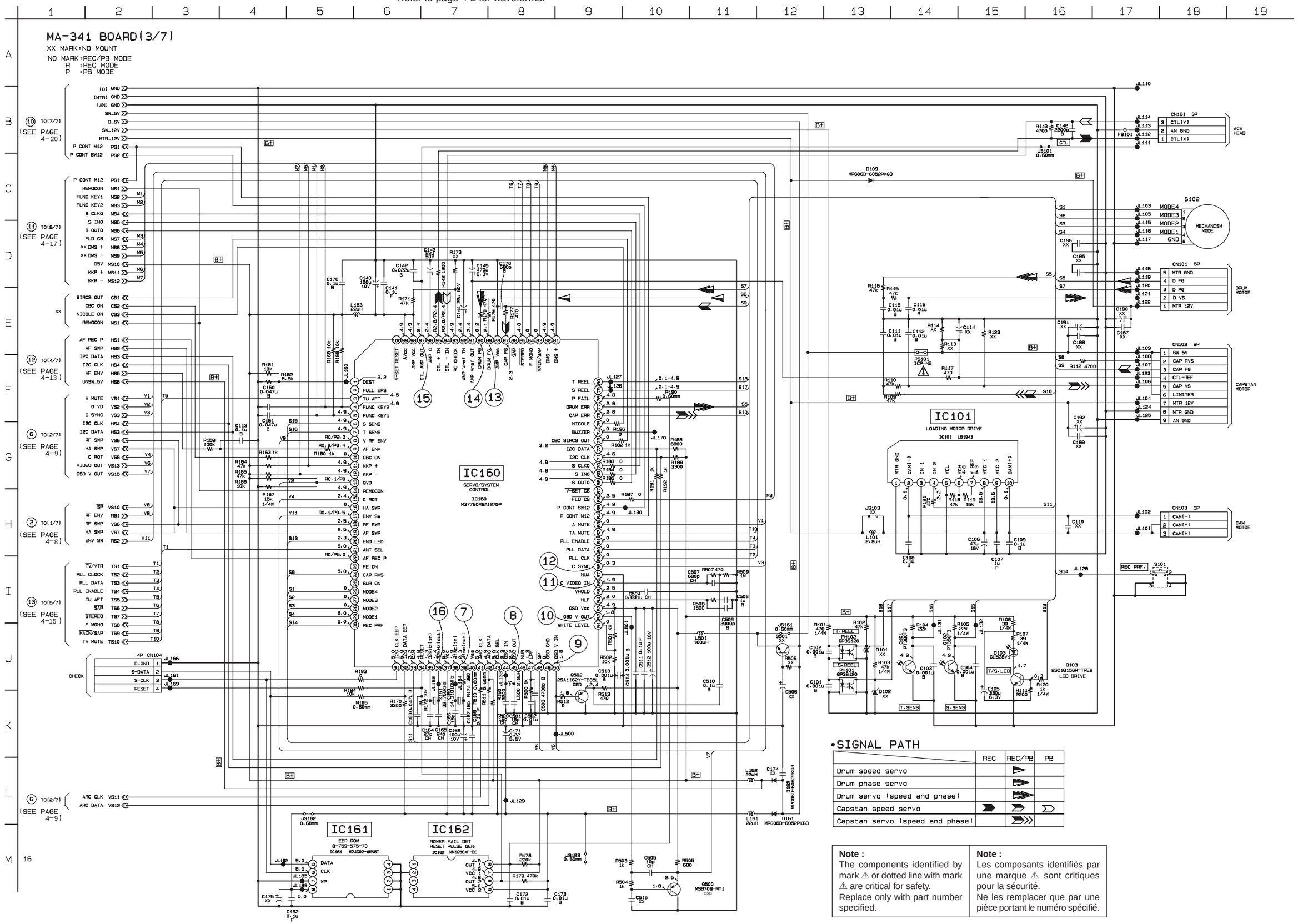


MA-341 (3/7) (SERVO/SYSTEM CONTROL) SCHEMATIC DIAGRAM

— Ref. No. MA-341 Board; 1,000 Series —

For schematic diagram

- Refer to page 4-5 for printed wiring board.
- Refer to page 4-2 for waveforms.



•SIGNAL PATH

	REC	REC/PB	PB
Drum speed servo		▶	
Drum phase servo		▶	
Drum servo (speed and phase)		▶	
Capstan speed servo	▶	▶	▷
Capstan servo (speed and phase)		▶»	

Note :
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

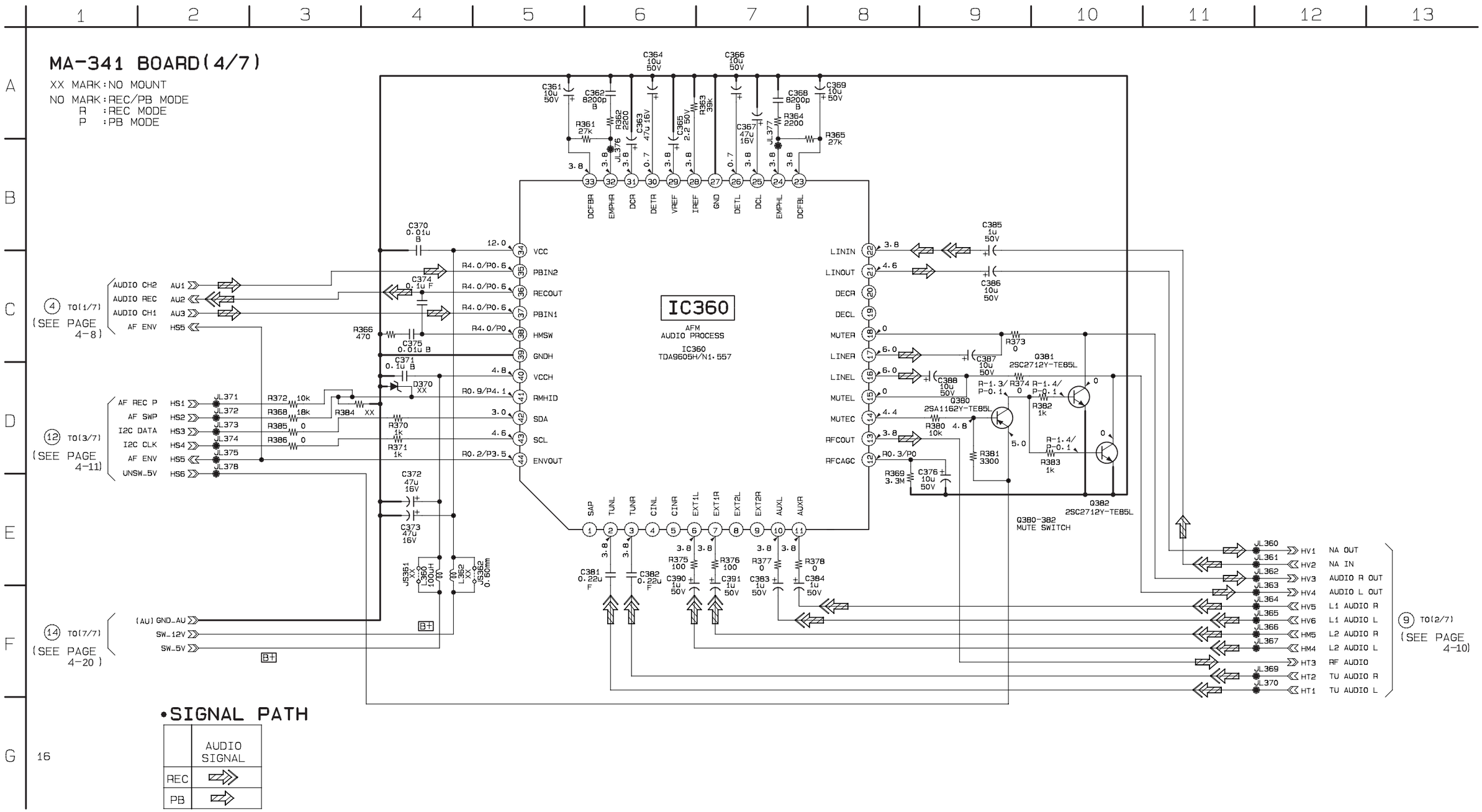
Note :
Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.

MA-341 (4/7) (AUDIO PROCESS) SCHEMATIC DIAGRAM

— Ref. No. MA-341 Board; 1,000 Series —

For schematic diagram

• Refer to page 4-5 for printed wiring board.

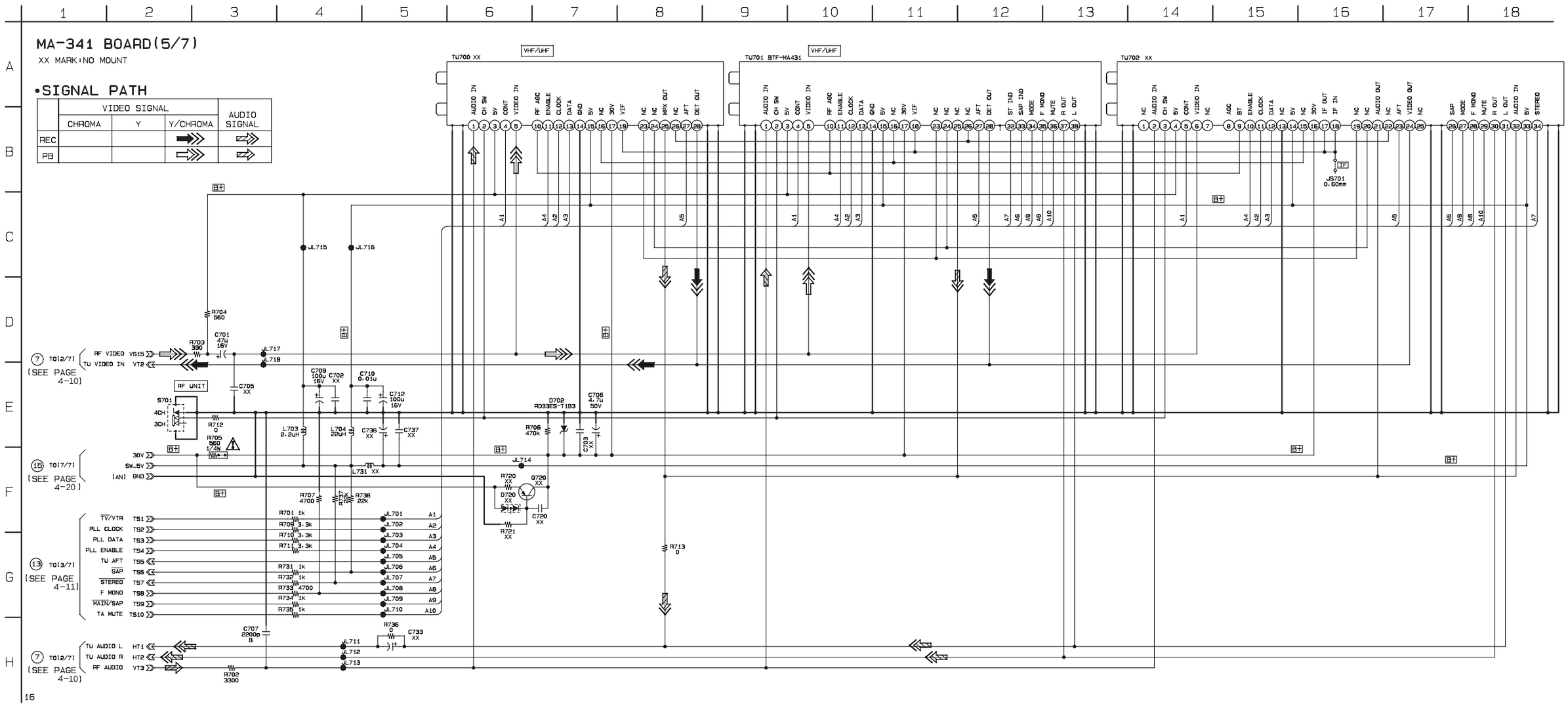


MA-341 (5/7) (TUNER) SCHEMATIC DIAGRAM

— Ref. No. MA-341 Board; 1,000 Series —

For schematic diagram

• Refer to page 4-5 for printed wiring board.



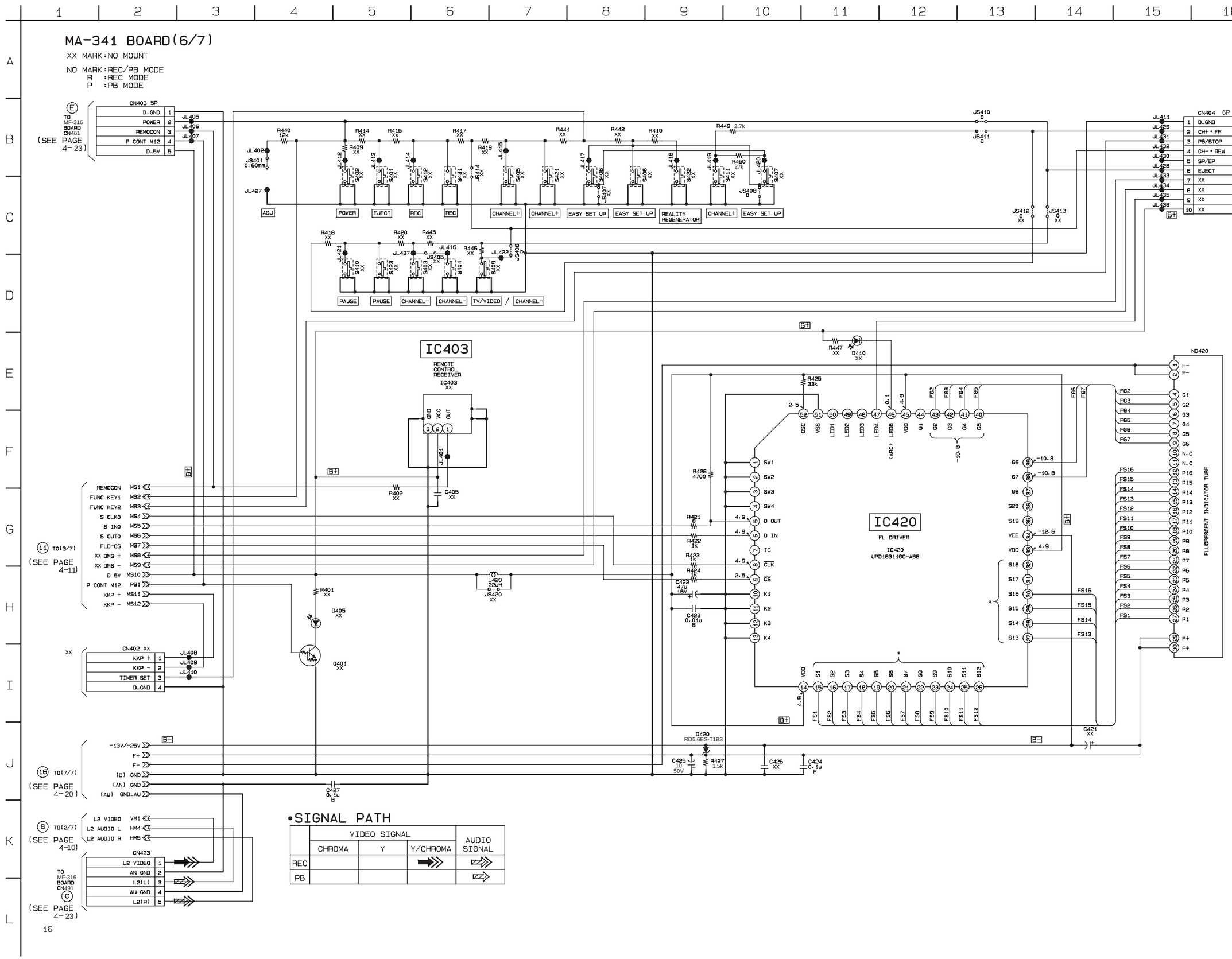
Note :	**Note :**
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

MA-341 (6/7) (MODE CONTROL) SCHEMATIC DIAGRAM

— Ref. No. MA-341 Board; 1,000 Series —

For schematic diagram

• Refer to page 4-5 for printed wiring board.

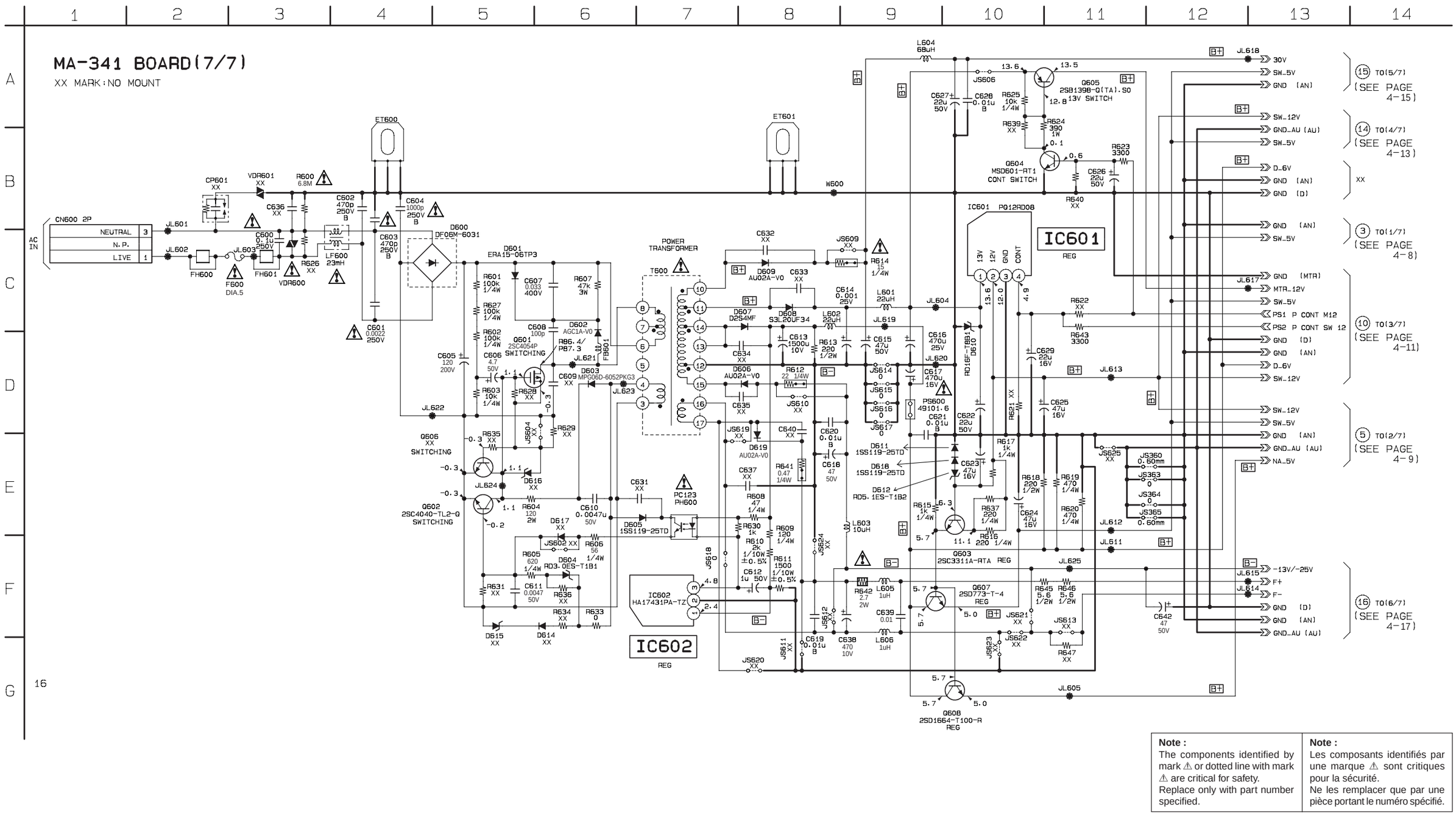


•SIGNAL PATH

	VIDEO SIGNAL			AUDIO SIGNAL
	CHROMA	Y	Y/CHROMA	
REC			➡	⇨
PB				⇨

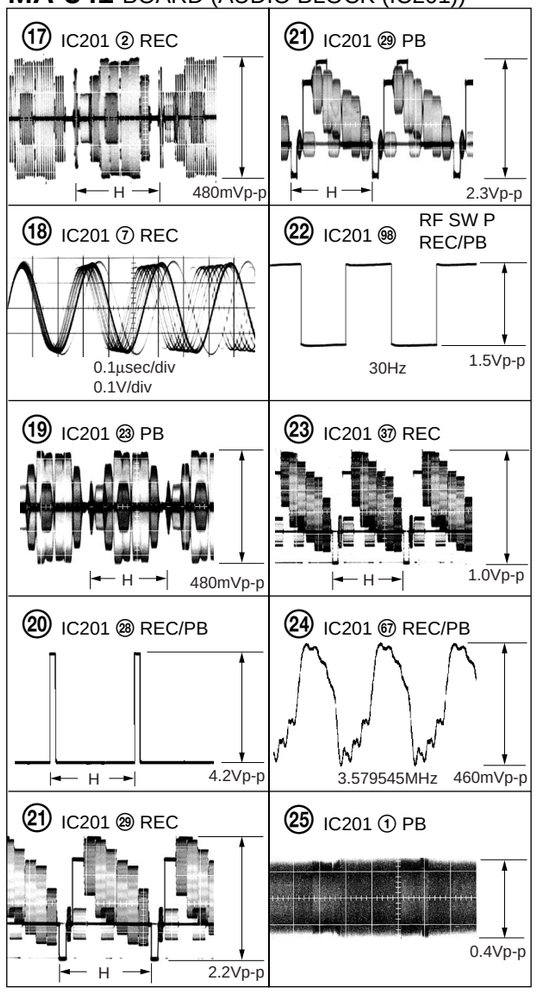
MA-341 (7/7) (POWER SUPPLY) SCHEMATIC DIAGRAM
— Ref. No. MA-341 Board; 1,000 Series —

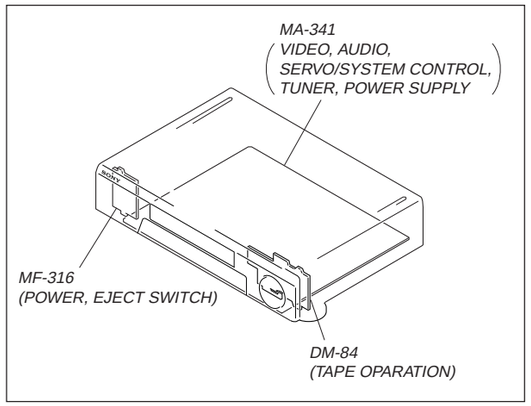
For schematic diagram
• Refer to page 4-5 for printed wiring board.



Note :	Note :
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

MA-341 BOARD (AUDIO BLOCK (IC201))



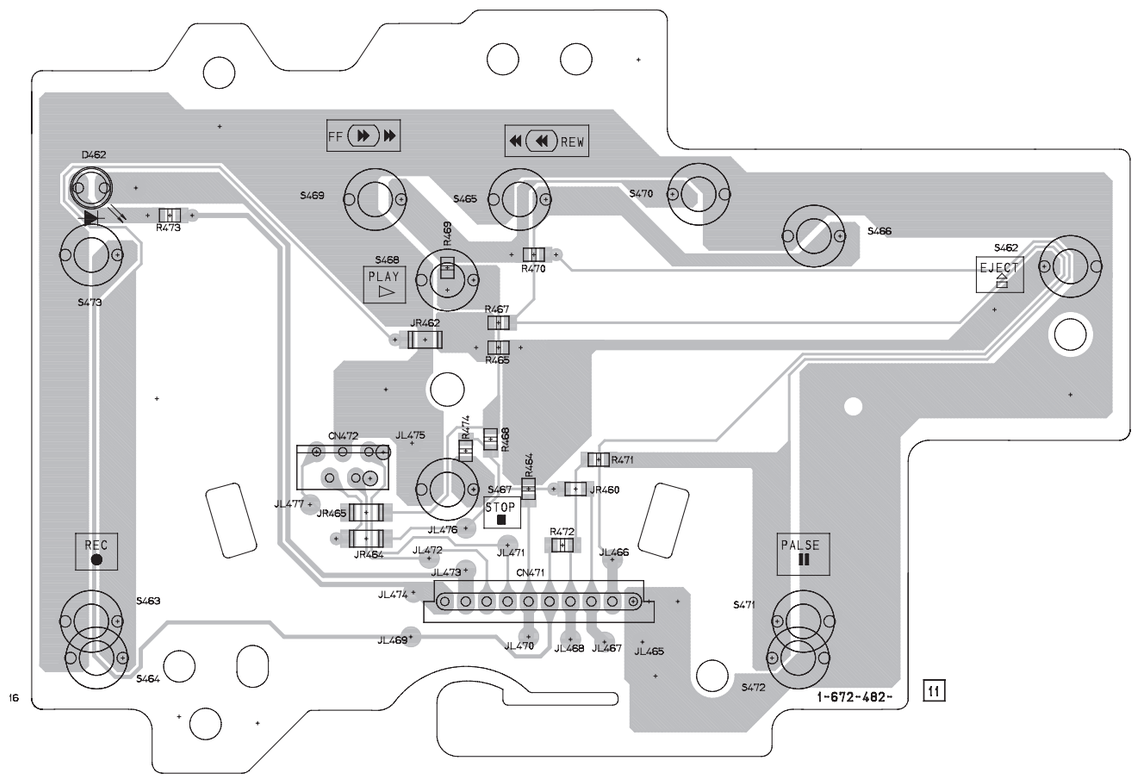


DM-84 (TAPE OPARATION) PRINTED WIRING BOARD

— Ref. No. DM-84 Board; 2,000 Series —

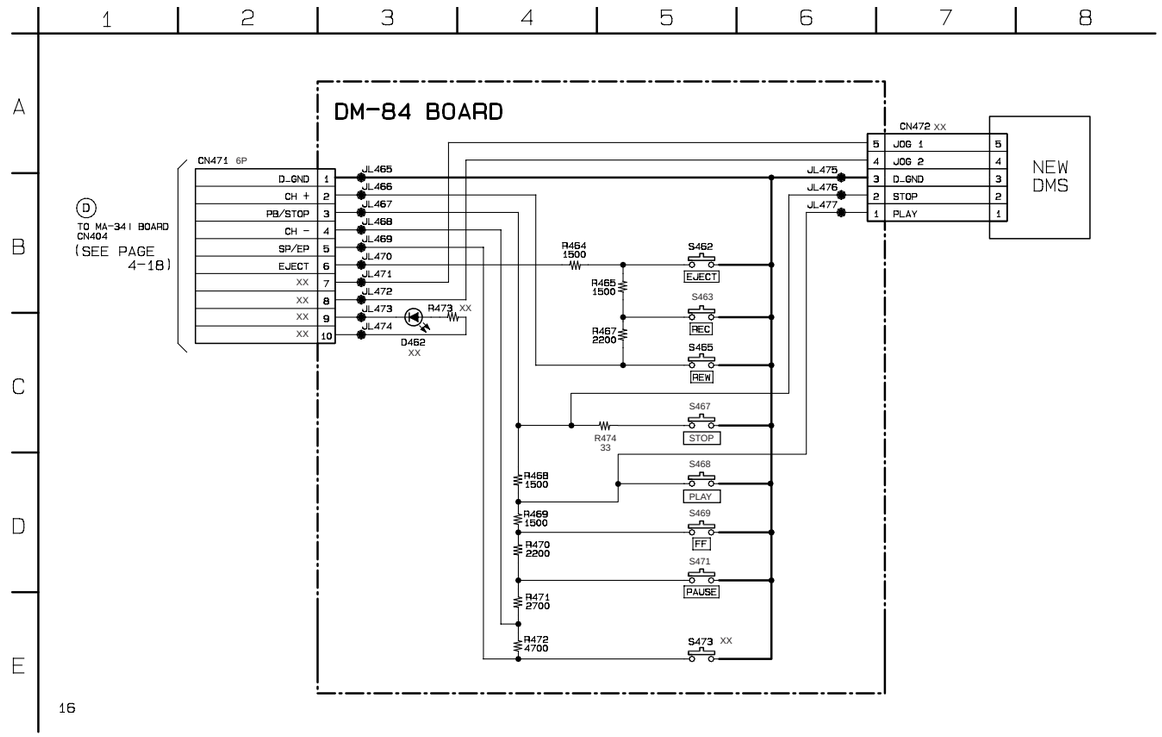
There are few cases that the part printed on this diagram isn't mounted in this model.

DM-84 BOARD (CONDUCTOR SIDE)



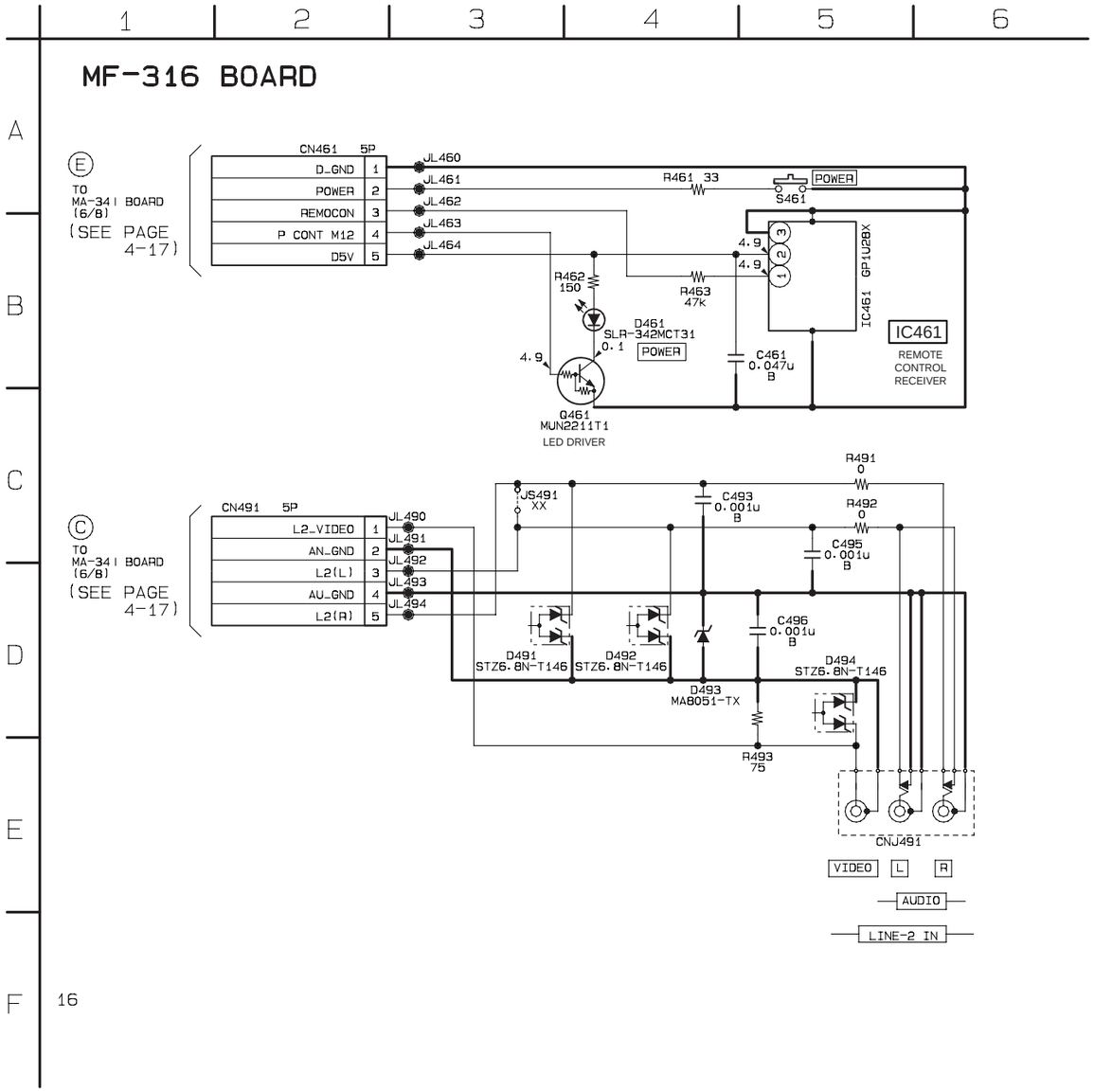
DM-84 (TAPE OPARATION) SCHEMATIC DIAGRAM

— Ref. No. DM-84 Board; 2,000 Series —



MF-316 (POWER/EJECT SWITCH) SCHEMATIC DIAGRAM

— Ref. No. MF-316 Board; 2,000 Series —

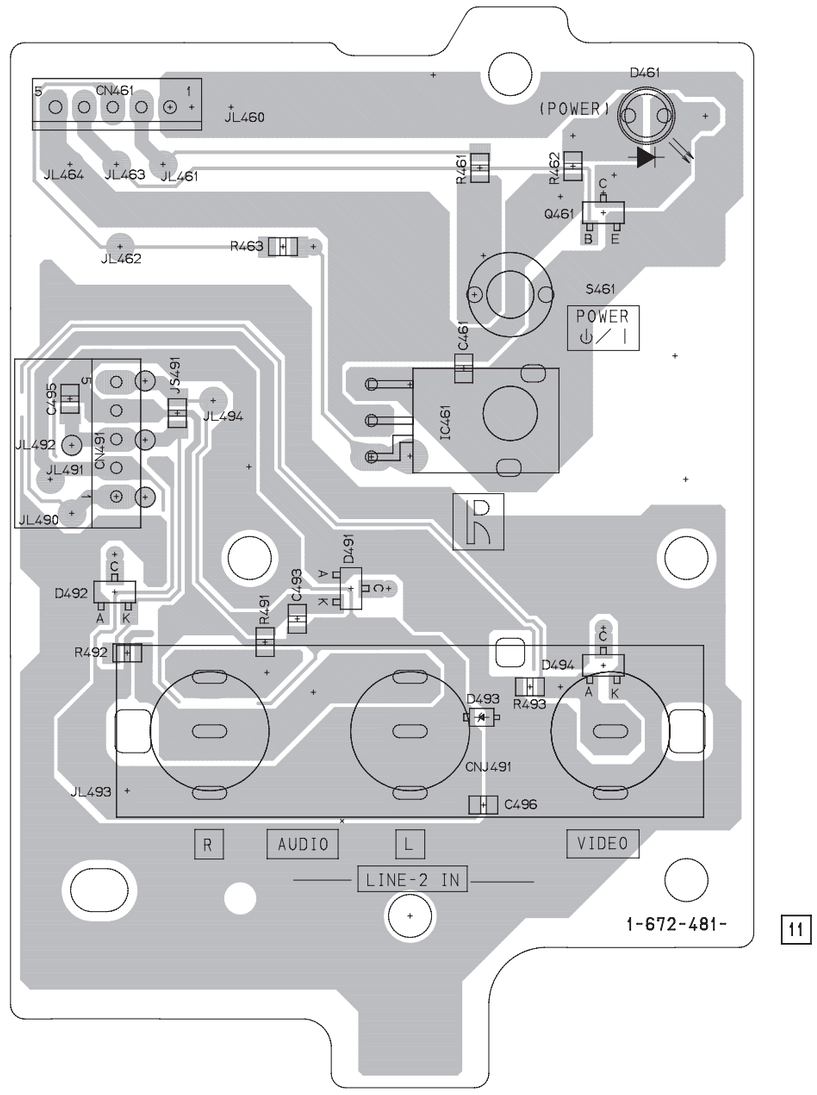


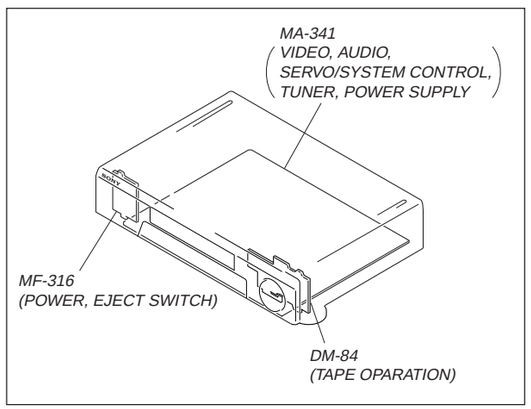
MF-316 (POWER/EJECT SWITCH) PRINTED WIRING BOARD

— Ref. No. MF-316 Board; 2,000 Series —

There are few cases that the part printed on this diagram isn't mounted in this model.

MF-316 BOARD(COUNDUCTOR SIDE)





SECTION 5
INTERFACE, IC PIN FUNCTION DESCRIPTION

5-1. SYSTEM CONTROL — MECHANISM BLOCK INTERFACE (MA-341 BOARD IC160)

Signal	Pin No.	I/O	EJECTED	CASSETTE LOARDING	CASSETTE UNLOARDING	TAPE THREADING	TAPE UNTEREADING	STOP	FF	REW	PB	REC
CAM	MA-341 Board IC160㉝	O	*5	H	L	H	L	*5	*5	*5	*5	*5
MODE 1	MA-341 Board IC160㉙	I	—	—	—	—	—	H	H	H	H	H
MODE 2	MA-341 Board IC160㉘	I	—	—	—	—	—	L	L	L	H	H
MODE 3	MA-341 Board IC160㉗	I	—	—	—	—	—	H	H	H	L	L
MODE 4	MA-341 Board IC160㉖	I	—	—	—	—	—	H	L	L	L	L
REC PRF	MA-341 Board IC160㉚	I	L	*1	*1	*1	*1	*1	*1	*1	*1	*1
T REEL	MA-341 Board IC160㉚	I	H/L	H/L	H/L	H/L	H/L	H/L	*2	*2	*2	*2
S REEL	MA-341 Board IC160㉙	I	H/L	H/L	H/L	*2	*2	H/L	*2	*2	*2	*2
END LED	MA-341 Board IC160⑳	O	L	*3	*3	*3	*3	*3	*3	*3	*3	*3
T SENS	MA-341 Board IC160⑦	I	*3	*3	*3	*4	*4	*4	*4	*4	*4	*4
S SENS	MA-341 Board IC160⑥	I	*3	*3	*3	*4	*4	*4	*4	*4	*4	*4

*1 "L" When erasing protection tab is bent. "H" when not bent.
*2 Pulse of period in proportion to reel rotating speed.
*3 Approx. 2 msec period "H" pluse when tape top or end is detected.
*4 Normally "L". 2 msec period "H" puise when tape top or end is detected.
*5 Hi-Z

5-2. SYSTEM CONTROL — SERVO PERIPHERAL CIRCUIT INTERFACE (MA-341 BOARD IC160)

Signal	Pin No.	I/O	STOP	FF	REW	TAPE THREADING	TAPE UNTEREADING	PB	REC
CTL IN+	MA-341 Board IC160㉟	O	*7	*7	*7	*7	*7	*7	*1
DRUM PG	MA-341 Board IC160㉚	I	*3	*3	*3	*3	*3	*3	*3
DRUM FG	MA-341 Board IC160㉙	I	*4	*4	*4	*4	*4	*4	*4
CAP FG	MA-341 Board IC160㉗	I	H/L	*2	*2	*5	*5	*2	*2
CAP RVS	MA-341 Board IC160㉔	O	H/L	L	H	L	H	L	L
CAP ERR	MA-341 Board IC160㉖	O	L	*6	*6	*6	*6	*6	*6
DRUM ERR	MA-341 Board IC160㉗	O	*6	*6	*6	*6	*6	*6	*6

*1. 30Hz pulse.
*2. Pulse of period in propotion to tape speed.
*3. 30Hz "H" pluse.
*4. 720 Hz pulse.
*5. Unstable period pulse.
*6. DC voltage 1 – 5V.
*7. Hi-Z (2.5V)

5-3. SYSTEM CONTROL — SYSTEM CONTROL PERIPHERAL CIRCUIT INTERFACE (MA-341 BOARD IC160)

Signal	Pin No.	I/O	I/O level
RESET	MA-341 Board IC160㉞	I	Normally “H”, “L” when service interruption detected or restored.
I2C DATA 1	MA-341 Board IC160㉜	I/O	Serial communication data to EEPROM I2C161.
I2C CLOCK 1	MA-341 Board IC160㉛	O	Serial communication clock to EEPROM I2C161.
I2C DATA VIDEO	MA-341 Board IC160⑦②	I/O	Serial communication data to video and audio microprocessor.
I2C CLOCK VIDEO	MA-341 Board IC160⑦①	O	Serial communication clock to video and audio microprocessor.
(ARC) S OUT 1	MA-341 Board IC160㊷	I/O	Serial communication data to ARC microprocessor.
(ARC) CLK 1	MA-341 Board IC160㊶	O	Serial communication clock to ARC microprocessor.

5-4. SYSTEM CONTROL AND RF MODULATOR — INPUT SELECTION BLOCK INTERFACE (MA-341 BOARD IC160)

Signal	Pin No.	I/O	I/O level
ANT SEL	MA-341 Board IC160㉑	O	“L” when RF modulator through.

5-5. SYSTEM CONTROL — VIDEO/RP BLOCK INTERFACE (MA-341 BOARD IC160)

Signal	Pin No.	I/O	STOP/FF /REW	TAPE LOADING	TAPE UNLOADING	PB	REC	REC/ PAUSE
RF SWP	MA-341 Board IC160⑱	O	*1	*1	*1	*1	*1	*1
QVD	MA-341 Board IC160⑬	O	L	L	L	*2	L	L
C SYNC	MA-341 Board IC160㊽	I	*3	*3	*3	*3	*3	*3

*1. Synchronized with drum rocation, 30Hz 50% duty pulse.
*2. Normal “L”, “H” when video signal is not rgenerated.
*3. Composite sync signal (positive).

5-6. SYSTEM CONTROL — AUDIO BLOCK INTERFACE (MA-341 BOARD IC160)

Signal	Pin No.	I/O	STOP/FF /REW	TAPE LOADING	TAPE UNLOADING	PB	REC	REC/ PAUSE
A MUTE	MA-341 Board IC160㊸	O	L	L	L	L	L	H
AF REC P	MA-341 Board IC160㉒	O	L	L	L	L	L	H

5-7. SERVO/SYSTEM CONTROL MICROPROCESSOR PIN FUNCTIONS (MA-341 BOARD IC160)

Pin No.	Pin Name	I/O	Function
1	DEST	I	Destination control input
2	FULL ERS		NC
3	TU AFT	I	Tuner analog AFT input
4	FUNC KEY2	I	Key input
5	FUNC KEY1	I	Key input
6	S SENS	I	Tape end sensor input
7	T SENS	I	Tape top sensor input
8	V RF ENV	I	Video playback signal envelope input
9	AF ANV	I	Hi-Fi audio playback signal envelope input
10	CBC ON	O	Cable box control signal output
11	KKP+	I	ETR pulese signal input
12	KKP–	I	ETR pulese signal input
13	QVD	O	Quasi VD pulese output
14	REMOCON	I	Remote sires signal input
15	C ROT	O	Head AZ signal output
16	HA SWP	O	SP/EP changed head signal
17	ENV SW	I	SP/EP head output lebel ditaction signal
18	RF SWP	O	VIDEO RF switching pulse output.
19	AF SWP	O	AF switching pulse output.
20	END LED	O	END sensor LED output
21	ANT SEL	O	TV/VTR RF modulator control output
22	AF REC P	O	Hi-Fi record control pulse output.
23	FE ON		NC
24	CAP RVS	O	Capstan reverse control
25	SUR ON		NC
26	MODE4	I	Mechanism section CAM encoder input (data4)
27	MODE3	I	Mechanism section CAM encoder input (data3)
28	MODE2	I	Mechanism section CAM encoder input (data2)
29	MODE1	I	Mechanism section CAM encoder input (data1)
30	REC PRF	I	Erasing protection tab, cassette IN detection input
31	I2C CLK EEP	I/O	HC CLOCK line (EEPROM)
32	I2C DATA EEP	I/O	HC DATA line (EEPROM)
33	CAM	O	Cam motor control signal output
34	RESET	I	System reset input
35	32kHz (in)	I	Sub clock 32MHz
36	32kHz (out)	O	Sub clock 32MHz
37	Vcc	I	5V
38	4fsc (in)	I	Main clock input
39	4fsc (out)	O	Main clock output
40	Vss		Ground
41	ARC CLK	O	Rearityregenarator (ARC) control clock signal
42	ARC DATA	O	Rearityregenarator (ARC) control data signal
43	CLK SEL	I	CLOCK seleal “L” Sub clock, “H” main and sub clock.
44	OSC IN	I	OSD clock input
45	OSC OUT	O	OSD clock output
46	NUB		Ground
47	LPF	I/O	fsc filter
48	$\overline{SP}$	O	“L” output when SP mode.
49	OSD GND		Ground
50	OSD V IN	I	OSD Video signal input.

Pin No.	Pin Name	I/O	Function
51	WHITE LEVEL	I	White level signal input
52	OSD V OUT	O	OSD Video signal output
53	OSD Vcc		SW 5V (OSD block)
54	HLF	I/O	External low-pass filter for slicer/AFC is connected to this terminal
55	V HOLD	I/O	External capacitor for slicer is connected to this terminal
56	C VIDEO IN	I	Control video signal input (osd, tuner, sorvo)
57	NUA		D Ground
58	C SYNC	I	Composite sync input
59	PLL CLK	O	Tuner PLL clock output
60	PLL DATA	O	Tuner PLL data output
61	PLL ENABLE	O	Tuner enable output
62	TA MUTE	O	Tuner audio mute output
63	A MUTE	O	AUDIO mute output
64	P CONT M12	O	Motor 12V control output
65	P CONT SW12	O	SW 12V control output
66	$\overline{\text{FLD CS}}$	O	FLD drive chip select signal output
67	$\overline{\text{V-SET CS}}$	O	V-set micon chip select signal output
68	S OUT0	O	Serial communication signal (FLD, V-SET)
69	S IN 0	I	Serial communication signal (FLD, V-SET)
70	S CLK 0	O	Serial communication signal (FLD, V-SET)
71	I2C CLK	I/O	IIC clock signal (VIDEO, HiFi)
72	I2C DATA	I/O	IIC data signal (VIDEO, HiFi)
73	CBC SIRCS OUT	O	Cable mouse sircs signal output
74	BUZZER		NC
75	NICOLE	O	Timing signal output
76	CAP ERR	O	Capstan error D/A output
77	DRUM ERR	O	Drum error D/A output
78	P FAIL	I	Power fail detection input
79	S REEL	I	Supply reel sensor input
80	T REEL	I	Take up reel sensor input
81	DMS+	I	DMS control input
82	DMS–	I	DMS control input
83	$\overline{\text{MAIN}}$/SAP	O	Tuner MAIN/SAP select signal
84	F MONO	O	Tuner audio normal select
85	$\overline{\text{STEREO}}$	I	Tuner Stereo ditection “L” when Stereo mode.
86	$\overline{\text{SAP}}$	I	Tuner SAP ditection “L” when SAP mode.
87	CAP FG	I	Capstan FG signal input
88	AMP Vss		Ground
89	DRUM FG	I	Drum FG input.
90	DRUM PG	I	Drum PG input.
91	AMP Vref OUT	O	Analog AMP reference Vcc output
92	AMP Vref IN	I	Analog AMP reference Vcc input
93	RC CHECK	I	Check input
94	CTL–IN	I/O	Control signal IN/OUT
95	CTL+IN	I/O	Control signal IN/OUT
96	AMP C		Control signal AC conect
97	CTL AMP OUT	O	Control signal AMP output
98	AMP Vcc		D-5V
99	A Vcc		D-5V
100	$\overline{\text{V-SET RESET}}$	O	NC

SECTION 6
ADJUSTMENTS

6-1 MECHANICAL ADJUSTMENTS

For the mechanical adjustments, please refer to the "VHS MECHANICAL ADJUSTMENT MANUAL Ⅵ (S MECHANISM)" (9-921-647-11).

6-2. ELECTRICAL ADJUSTMENTS

See the adjusting part location diagram from on page 6-6 for the adjustment.

2-1. PREPARATION BEFORE ADJUSTMENT

2-1-1. Equipment Required

The measuring instruments used for this alignment include:

1) Monitor TV
2) Oscilloscope, dual-trace, bandwidth of 30 MHz or more, with delay mode (A probe 10:1 should be used unless otherwise specified.)
3) Frequency counter
4) NTSC Pattern generator
5) Remote commander
6) Digital voltmeter
7) Audio generator
8) Audio level meter
9) Audio attenuator
10) Alignment tapes
    KRV-51N2 (NTSC) Part No. : 8-192-605-32

2-1-2. Equipment Connection

Unless otherwise specified, connect and adjust the measuring instruments as shown in the following diagram.

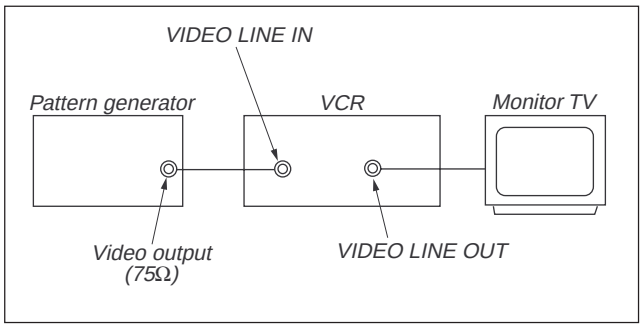


Fig. 6-2-1

2-1-3. Set-up of Adjustment

In this adjustment, NTSC pattern generator is connected with LINE input terminal. When check to tuner, connected AERIAL terminal. Check that the synchronizing signal of the Y signal has an amplitude of approximately 0.7 V and that the burst signal has an amplitude of approximately 0.3 V and its waveform is flat. And check that the level ratio of burst signal to "red" signal is 0.30 : 0.66. The video signal (color bar) used for electrical aligning this unit is shown in Fig. 6-2-2.

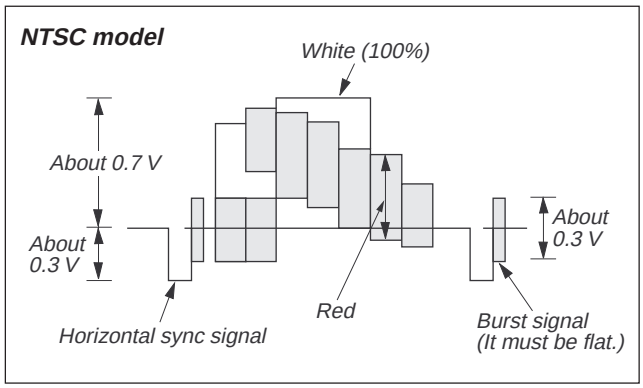


Fig. 6-2-2 Color Bar Signals of Pattern Generator

2-1-4. Alignment Tape

• Contents of KRV-51N2

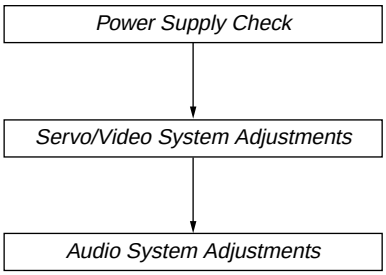
	Mode	Period	Video signal	Audio signal	
				Hi-Fi	Normal
1	SP	7 minutes	Color bar	400Hz (L/R)	400Hz
2		3 minutes	Monoscope		
3	LP	7 minutes	Color bar		
4		3 minutes	Monoscope		

2-1-5. Input/Output Levels and Impedance

Video input: LINE IN
Input signal: 1 Vp-p, 75 ohms, unbalanced, sync negative
Video output: LINE OUT
Output signal: 1 Vp-p, 75 ohms, unbalanced, sync negative
Audio input: LINE IN
Input level: –7.5 dBs
(0 dBs= 0.775 Vrms)
Input impedance: more than 47 kilohms
Audio output: LINE OUT
Standard level: –7.5 dBs at load impedance 47 kilohms
Output impedance: less than 10 kilohms

2-1-6. Adjustment Sequence

The adjustments should be performed in the following sequence.



2-2. POWER SUPPLY CHECK

2-2-1. Output Voltage Check (MA-341 Board)

Mode	STANDBY
+30 V Check	
Measurement point	C627 ⊕
Specified value	31.0 to 39.0 V
–11 V Check	
Measurement point	C642 ⊖
Specified value	–12.5 to – 9.5 V

+6 V Check	
Measurement point	Corrector of Q607
Specified value	5.56 to 6.25 V
Mode	E-E
Measuring Instrument	Digital voltmeter
+12 V Check	
Measurement point	IC601 pin ②
Specified value	11.7 to 12.3 V
+5 V Check	
Measurement point	Emitter of Q603
Specified value	4.8 to 5.4 V
MTR12 V Check	
Measurement point	Correcter of Q605
Specified value	12.5 to 14.5 V

[Check Method]

1) Each of these supply voltages must meet its specified value.

2-3. SERVO SYSTEM CHECK

2-3-1. RF Switching Position Adjustment (MA-341 Board)

[Adjustment Purpose]

To adjust the link of the A-ch and B-ch of the tape playback outputs. To make the unit compatible with other tapes and units. If this specification is not satisfied, the link will appear on the screen and the screen will be disrupted, etc.

Mode	Playback
Signal	Alignment tape: SP color bar portion
Measurement point	CH1: CN270 pin ② (PB RF) CH2: CN270 pin ③ (RF SWP)
Measuring instrument	Oscilloscope
Adjusting element	REMOCON CH+/–
Specified value	A=minimize

[Adjustment Method]

1) Playback the alignment tape.
2) Short JS401 to Ground.
3) Check that "A P" is indicated on FL display.
4) Adjust so that part A becomes minimized at CH +/–.
5) Write data in EEPROM by pressing PAUSE button.

Monoral model:

6) The display "A P" disappears and then the Adjustment mode terminates.

Hi-Fi model:

6) The display changes to "A H" and the mode goes to the HiFi switching position Adjustment.

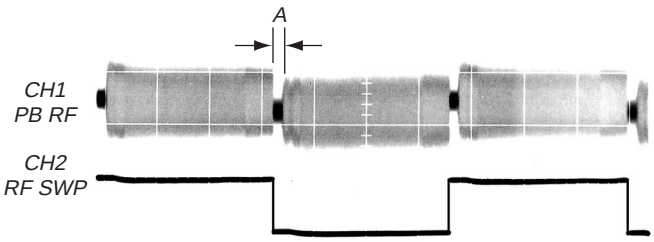


Fig. 6-2-3

2-4. AUDIO SYSTEM ADJUSTMENT

- Adjust both L ch and R ch.

[Connecting Instruments]

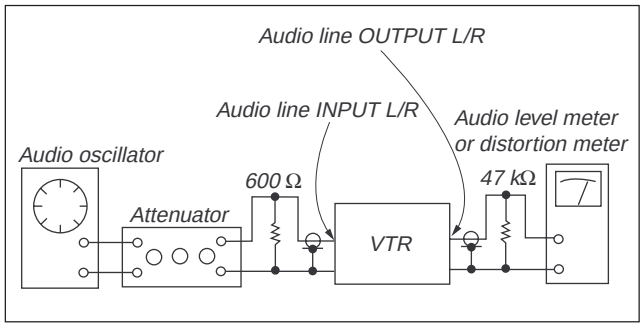


Fig. 6-2-4

2-4-1. Hi-Fi Audio System Adjustment (Hi-Fi model only)

- Perform the adjustment setting the switch on the following positions.
- AUDIO MONITOR ..... STEREO

[Adjustment Method]

1. ACE head adjustment.....Refer to the VHS mechanical adjustment manual Ⅵ (S MECHANISM)(9-921-647-11).
2. E-E output level check
3. "Recording Bias Adjustment"

2-4-2. HiFi Switching Position Adjustment (MA-341 Board)

[Adjustment Purpose]

To adjust the link of the A-ch and B-ch of the tape playback outputs. To make the unit compatible with other tapes and units. If this specification is not satisfied, the link will appear on the screen and the screen will be disrupted, etc.

Mode	Playback
Signal	Alignment tape: SP color bar portion
Measurement point	CH1: Pin ① of CN270 (HF ADJ) CH2: Pin ③ of CN270 (RF SWP)
Measuring instrument	Oscilloscope
Adjusting element	REMOCON CH +/–
Specified value	B=minimize

[Adjustment Method]

1) Check that "A H" is indicated on FL display.
2) Adjust so that part B becomes minimized at CH +/–.
3) Write data EEPROM by pressing PAUSE button.
4) Check that "A H" indicator turns off.
5) If "A H" indicator is still on, restart RF switching position Adjustment from the beginning.

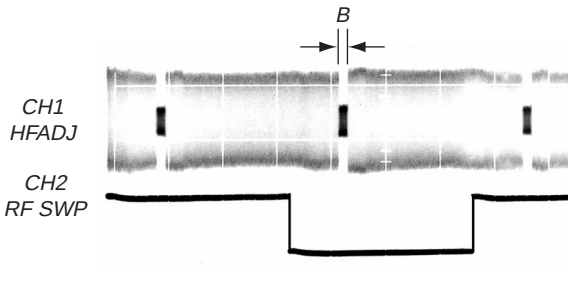


Fig. 6-2-5

2-4-3. Normal Audio System Adjustment

- Make adjustment in the SP mode unless otherwise specified. Use a normal VHS cassette for an adjustment tape.
- Set AUDIO MONITOR to normal.

2-4-4. ACE Head Adjustment

Refer to the VHS mechanical adjustment manual Ⅵ (S MECHANISM) (9-921-647-11).

2-4-5. E-E Output Level Check

[Adjustment purpose]

Confirm that the output level adjust the reference input is within the specification.

Mode	E-E
Signal	400 Hz, –7.5 dBs
Measurement point	CJ561 L/R
Measuring instrument	Audio level meter
Specified value	–7.5 ± 2 dBs

[Check Method]

1) Input signal of 400 Hz and –7.5 dBs to the CJ561 L/R.
2) Check that the audio output level is –7.5 ± 2 dBs.

2-4-6. Frequency Response Check

[Adjustment purpose]

Confirm that the frequency characteristic is within the specification.

Mode	REC and PB (SP mode)
Signal	400 Hz, –17.5 dBs 7 kHz, –17.5 dBs
Measurement point	Audio output terminal
Measuring instrument	Audio level meter
Specified value	0 ± 3 dB

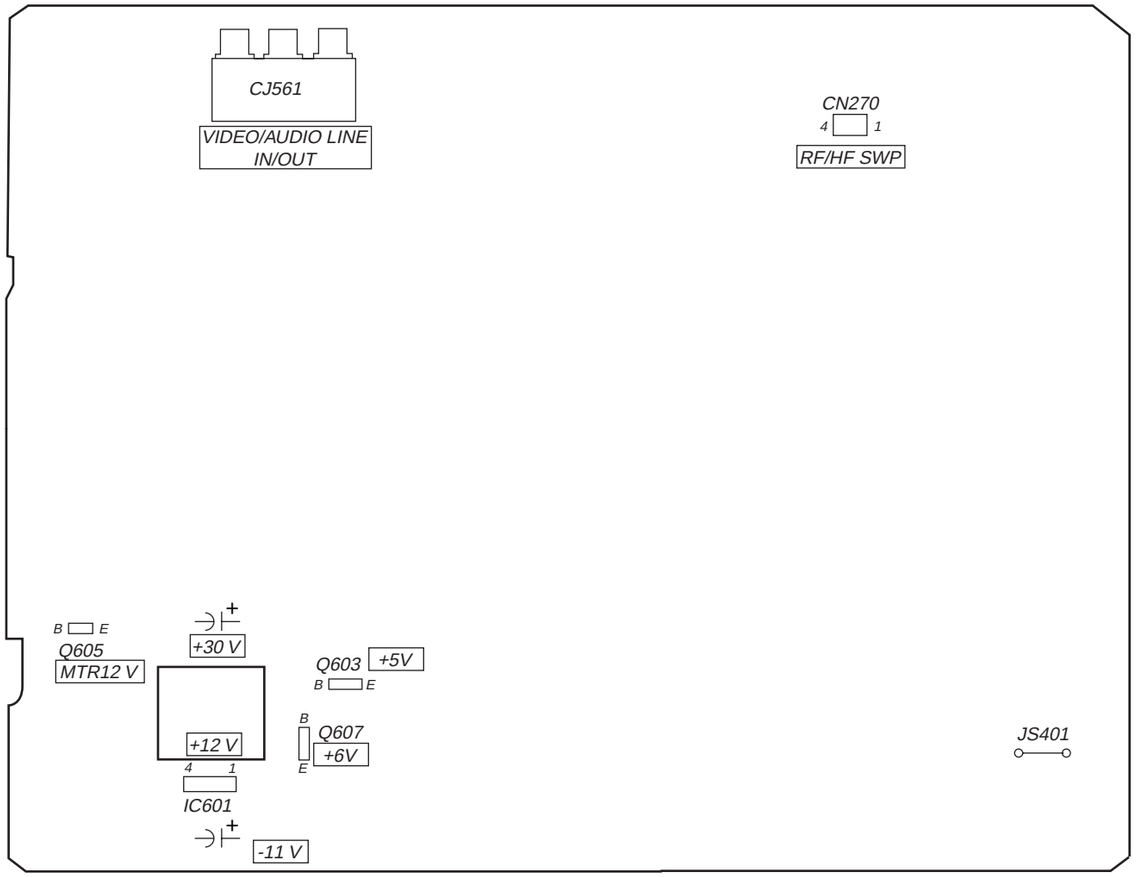
Note: Tape path adjustment must have been completed.

[Confirmation Method]

1) Supply a signal of 400 Hz, –17.5 dBs to both L and R channels of Audio Line Input.
2) Connect the audio level meter to the Audio Line Output.
3) Adjust the attenuator so that the audio level meter will indicate –17.5 dBs.
4) Make recording in the SP mode.
5) Set an audio line input signal to 7 kHz and make recording.
6) Playback a recorded portion, and measure output levels at 400 Hz and 7 kHz.
7) Confirm that the 7 kHz playback output level within a range of the 400 Hz playback output level 0 ± 3 dB.

2-5. ADJUSTING PARTS LOCATION DIAGRAM

MA-341 BOARD
(CONDUCTOR SIDE)



SECTION 7
REPAIR PARTS LIST

7-1. EXPLODED VIEWS

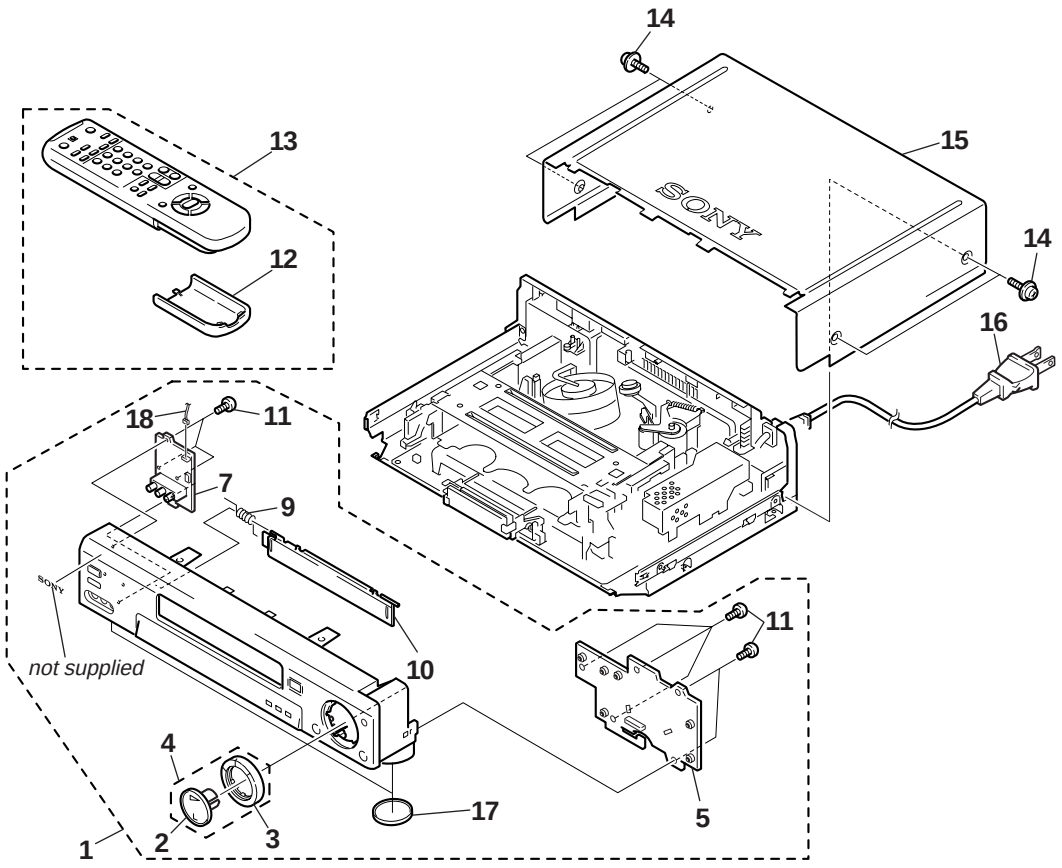
NOTE:

- -XX, -X mean standardized parts, so they may have some differences from the original one.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list and accessories and packing materials are given in the last of this parts list.
- Abbreviation
  CND: Canadian

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

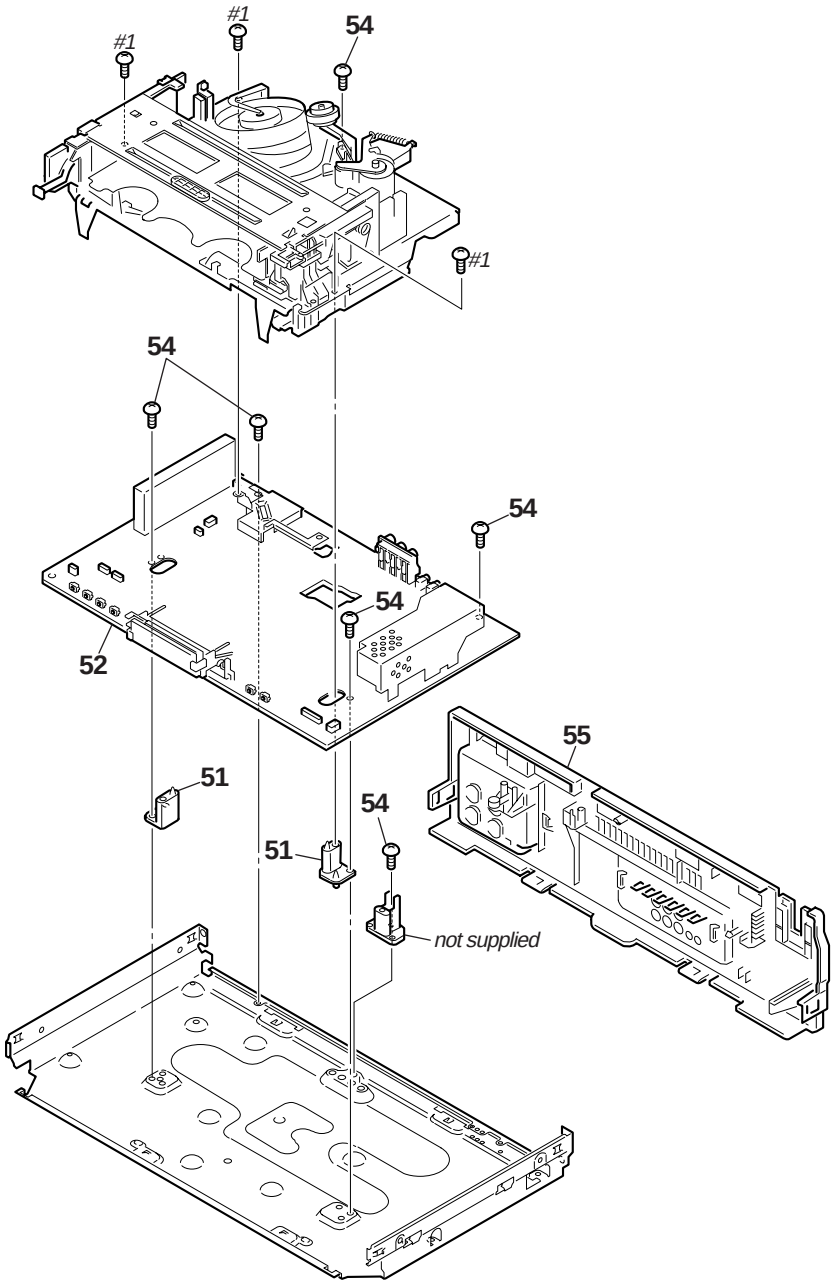
Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.

7-1-1. FRONT PANEL AND UPPER CASE SECTION



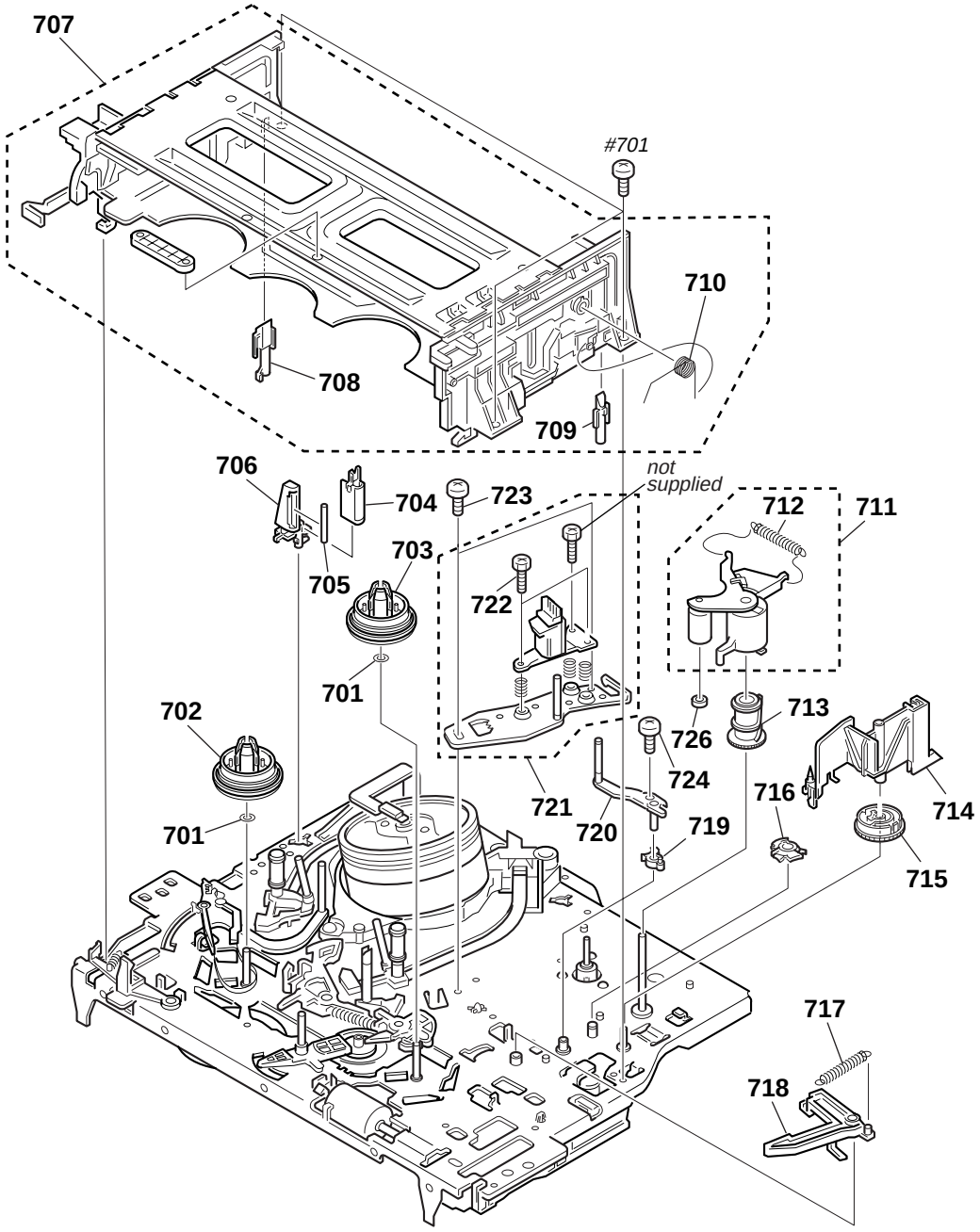
Ref. No.	Part No.	Description	Remarks
1	X-3949-121-1	PANEL ASSY, FRONT (779)	
1	X-3949-531-1	PANEL ASSY, FRONT (772)	
2	3-972-518-11	BUTTON, CENTER (772)	
2	3-987-939-22	BUTTON CENTER (779)	
3	3-987-938-21	BUTTON, RING (779)	
3	3-987-816-01	RING, BUTTON (772)	
4	X-3948-232-1	BUTTON ASSY, FUNCTION (779)	
4	X-3948-599-1	BUTTON ASSY, FUNCTION (772)	
* 5	A-6791-804-A	DM-84 BOARD, COMPLETE	
* 7	A-6791-803-A	MF-316 BOARD, COMPLETE	
9	3-953-432-01	SPRING (GE), FL	
10	3-979-302-61	DOOR, CASSETTE (779)	
11	4-921-277-41	SCREW (B2.6 × 8), TAPPING, BIND	
12	3-709-432-01	COVER, REMOTE CONTROL BATTERY	
13	1-418-153-11	COMMANDER, STANDARD (RMT-V266)	
14	3-710-901-11	SCREW, TAPPING	
15	3-977-136-71	CASE, UPPER (772)	
15	3-977-136-81	CASE, UPPER (779)	
⚠ 16	1-790-293-31	CORD, POWER	
* 17	3-977-160-01	INSULATOR	
18	1-779-725-11	CONNECTOR, BOARD TO BOARD 5P	

7-1-2. CHASSIS SECTION



Ref. No.	Part No.	Description	Remarks
* 51	3-959-383-01	BASE (R), MD	
* 52	A-6791-802-A	MA-341 BOARD, COMPLETE	
54	3-970-608-21	SUMITITE (B3), +BV	
55	3-979-564-51	PANEL, REAR	

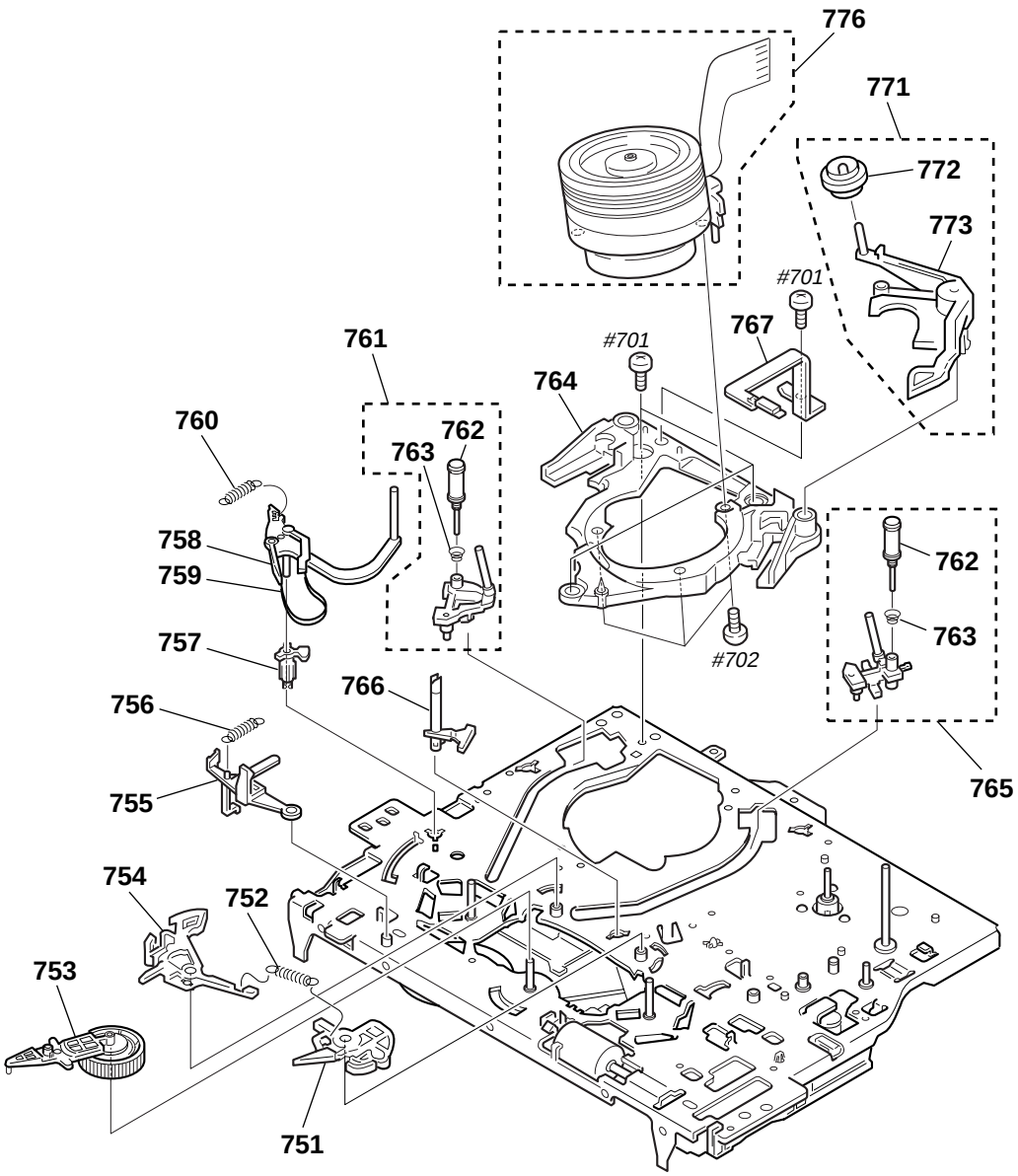
7-1-3. MECHANISM DECK SECTION-1



Ref. No.	Part No.	Description	Remarks
701	3-977-509-01	WASHER, THRUST	
702	3-977-507-01	TABLE, REEL (S) (GRAY)	
703	3-977-508-01	TABLE, REEL (T) (BLACK)	
704	1-500-144-11	HEAD, FE	
705	3-977-495-01	SHAFT TG2	
706	3-977-494-01	HOLDER, FEH	
707	A-6759-619-C	FL COMPLETE ASSY BOARD, COMPLETE	
708	3-977-535-01	PLATE, LUMINOUS (END SENSOR)	
709	3-977-536-01	PLATE, LUMINOUS (TOP SENSOR)	
710	3-970-471-01	SPRING (DECK OPEN), TORSION	
711	A-6759-615-A	PRESS BLOCK ASSY, PINCH	
712	3-958-455-01	SPRING (PINCH), TENSION	
713	3-977-447-01	GEAR, ELEVATOR	

Ref. No.	Part No.	Description	Remarks
714	3-977-514-01	OPENER, LID	
715	3-977-441-01	GEAR, PINCH PRESSING	
716	3-977-445-01	GEAR, TG8 ARM DRIVING	
717	3-977-465-01	SPRING, EXTENSION (RVS BRAKE)	
718	X-3947-582-1	ARM ASSY, RVS BRAKE	
719	3-977-446-01	GEAR, TG8 ARM	
720	X-3947-590-1	TG8 ASSY	
721	A-6759-620-A	HEAD BLOCK ASSY, ACE (TDK)	
722	3-974-556-01	+HEXA TT 2.6 × 9 (TAPER)	
723	3-979-508-01	SCREW +HEXA TP SW 3 × 8	
724	3-719-381-01	SCREW (M2 × 4)	
726	3-736-045-01	BEARING (NO FLANG), BALL	

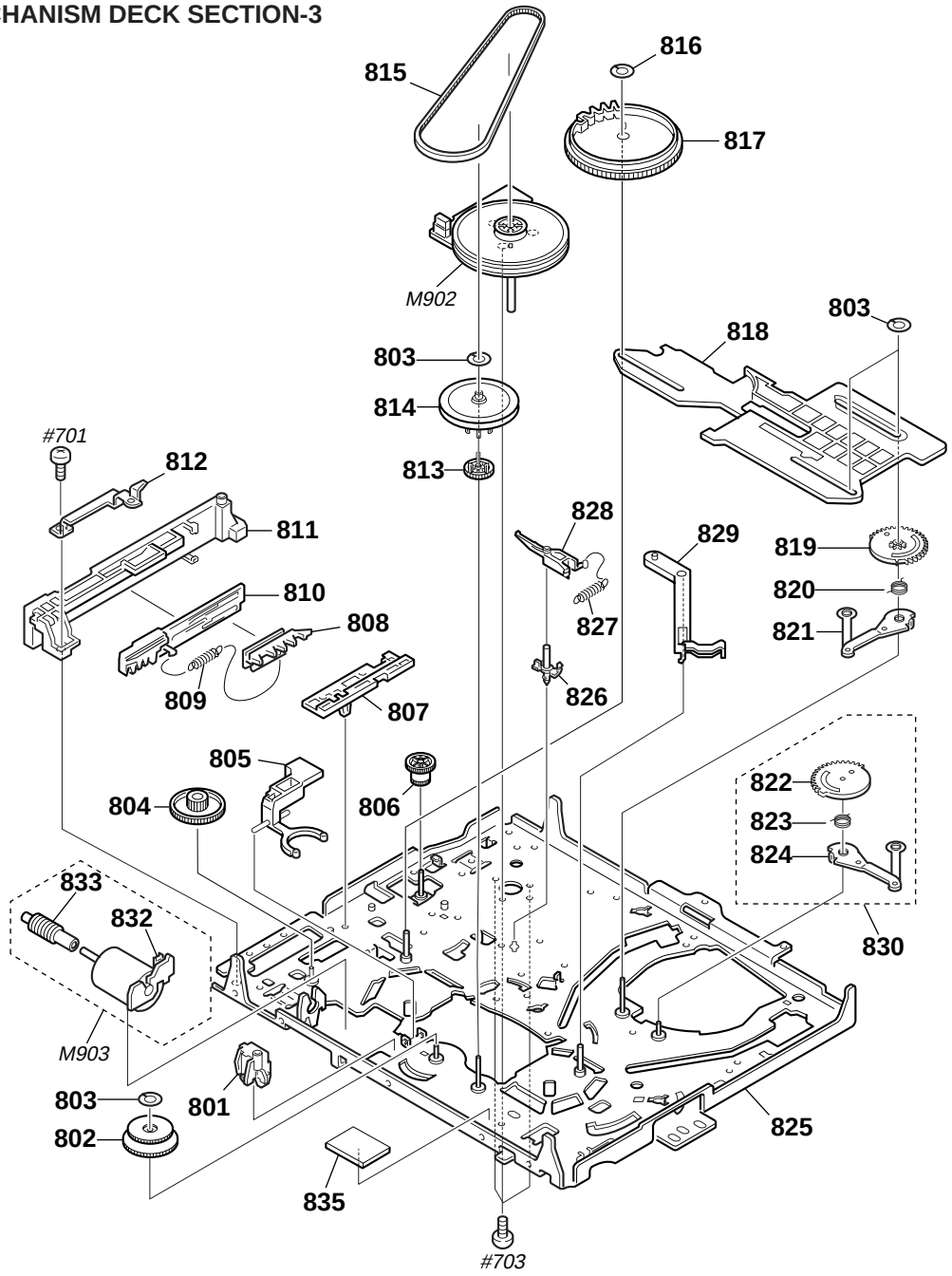
7-1-4. MECHANISM DECK SECTION-2



Ref. No.	Part No.	Description	Remarks
751	X-3947-581-1	BRAKE ASSY,MAIN(T)	
752	3-977-462-01	SPRING,EXTENTION. (MAIN BRAKE)	
753	X-3947-573-1	ARM ASSY, PENDULUM	
754	X-3947-580-2	BRAKE ASSY, MAIN(S)	
755	3-977-513-02	LEVER, REC PROOF	
756	3-976-767-01	SPRING, TENS. (REC. PROOF)	
757	3-977-487-01	BOSS, TG1 FULCRUM	
758	X-3947-587-1	TG1 ASSY	
759	X-3947-589-1	BAND ASSY, TG1	
760	3-977-488-01	SPRING (POWER TENSION)	
761	A-6750-324-A	SHUTTLE (S) BLOCK ASSY	

Ref. No.	Part No.	Description	Remarks
762	X-3944-378-1	ROLLER ASSY, GUIDE	
763	3-965-178-01	SPRING	
764	3-969-632-04	BASE, DRUM	
765	A-6750-328-E	SHUTTLE (T) BLOCK ASSY	
766	3-977-501-01	PLATE, LUMINOUS	
767	X-3943-899-8	GROUND ASSY, SHAFT	
771	A-6746-074-G	ROLLER BLOCK ASSY, HC	
772	X-3947-255-1	ROLLER ASSY, HC	
773	3-975-724-07	ARM, HC	
776	8-839-057-51	DRUM ASSY, DZH-0A7A/Z-RP	

7-1-5. MECHANISM DECK SECTION-3



Ref. No.	Part No.	Description	Remarks
801	3-977-437-01	RETAINER,CAM MOTOR	
802	X-3947-584-1	ASSY, REEL DIRECT	
803	3-977-443-01	WASHER, STOPPER	
804	3-977-438-01	WORM - WHEEL	
805	3-977-506-01	ARM, LIMITTER SELECTION	
806	3-977-444-01	GEAR, PINCH TRANSMISSION	
807	3-977-515-01	GUIDE, FL SLIDER	
808	3-977-517-01	PLATE, SLIDE, FL	
809	3-977-519-01	SPRING, TENS. (LIMIT, FL)	
810	3-977-518-02	PLATE, LIMITTER, FL	
811	3-977-516-01	HOLDER, FL SLIDER	
812	3-977-877-01	PLATE, RETAINER	
813	3-977-504-01	GEAR, CLUTCH	
814	X-3947-585-1	GEAR ASSY, PULLEY	
815	3-977-510-01	BELT, RUBBER	
816	3-977-440-01	WASHER, STOPPER	
817	3-977-439-01	GEAR, CAM	
818	3-977-442-01	SLIDER	

Ref. No.	Part No.	Description	Remarks
819	3-977-455-01	GEAR, LOADING(T)	
820	3-977-456-03	SPRING, TORSION (LOAD T)	
821	X-3947-579-1	LEVER ASSY, LOADING(T)	
822	3-977-451-01	GEAR, LOADING(S)	
823	3-977-452-01	SPRING, TORSION (LOAD S)	
824	X-3947-578-1	LEVER ASSY, LOADING (S)	
825	X-3947-576-2	CHASSIS ASSY, MECHANICAL	
826	3-977-468-01	SHAFT, CAPSTAN BRAKE	
827	3-977-467-02	SPRING, CAP BRAKE	
828	X-3947-583-1	BRAKE ASSY, CAPSTAN	
829	3-977-489-01	ARM, TG1 DRIVING	
830	A-6759-616-A	GEAR BLOCK ASSY, LOADING (S)	
832	1-766-723-21	CONNECTOR, BOARD TO BOAR 3P	
833	3-977-436-01	WORM	
835	3-989-917-01	SPACER (REC PROOF)	
M902	1-698-971-11	MOTOR, DC	
M903	X-3947-577-1	MOTOR ASSY, CAM	

7-2. ELECTRICAL PARTS LIST

NOTE:

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX, -X mean standardized parts, so they may have some difference from the original one.
- Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- CAPACITORS:
  uF: µF
- RESISTORS
  All resistors are in ohms.
  METAL: metal-film resistor
  METAL OXIDE: Metal Oxide-film resistor
  F: nonflammable
- COILS
  uH: µH
- Abbreviation
  CND: Canadian
- SEMICONDUCTORS
  In each case, u: µ, for example:
  uA...: µA... , uPA... , µPA... , uPB... , µPB... , uPC... , µPC... , uPD..., µPD...

When indicating parts by reference number, please include the board name.

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.

Ref. No.	Part No.	Description			Remarks
*	A-6791-804-A	DM-84 BOARD, COMPLETE			
		**********			
					(Ref.No.:2,000 Series)
		< JUMPER RESISTOR >			
JR460	1-216-295-00	METAL CHIP	0	5%	1/10W
JR462	1-216-296-00	METAL CHIP	0	5%	1/8W
JR464	1-216-296-00	METAL CHIP	0	5%	1/8W
JR465	1-216-296-00	METAL CHIP	0	5%	1/8W
		< RESISTOR >			
R464	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R465	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R467	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R468	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R469	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R470	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R471	1-216-059-00	METAL CHIP	2.7K	5%	1/10W
R472	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R474	1-216-013-00	METAL CHIP	33	5%	1/10W
		< SWITCH >			
S462	1-762-196-21	SWITCH, TACT (EJECT)			
S463	1-762-196-21	SWITCH, TACT (REC)			
S465	1-762-196-21	SWITCH, TACT (REW)			
S467	1-762-196-21	SWITCH, TACT (STOP)			
S468	1-762-196-21	SWITCH, TACT (PLAY)			
S469	1-762-196-21	SWITCH, TACT (FF)			
S471	1-762-196-21	SWITCH, TACT (PAUSE)			
*	A-6791-802-A	MA-341 BOARD, COMPLETE			
		**********			
					(Ref.No.:1,000 Series)
*	3-951-893-01	HEAT SINK			
*	3-960-273-01	SPACER, TOP END			
*	3-960-274-01	SPACER, LED			
*	3-966-865-01	BASE, INDICATION TUBE			
	3-970-608-21	SUMITITE (B3), +BV			
		< CAPACITOR >			
C101	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C102	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C103	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C104	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C105	1-128-057-11	ELECT	330uF	20%	6.3V
C106	1-124-589-11	ELECT	47uF	20%	16V
C107	1-164-346-11	CERAMIC CHIP	1uF		16V
C108	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C109	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C111	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C112	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C113	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C115	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C116	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C140	1-124-584-00	ELECT	100uF	20%	10V
C141	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C142	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C143	1-128-131-11	ELECT	22uF	20%	50V
C144	1-128-131-11	ELECT	22uF	20%	50V
C145	1-126-935-11	ELECT	470uF	20%	6.3V
C146	1-164-161-11	CERAMIC CHIP	0.0022uF	10%	100V
C160	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C161	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C162	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C163	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C164	1-163-237-11	CERAMIC CHIP	27PF	5%	50V
C165	1-163-102-00	CERAMIC CHIP	24PF	5%	50V
C166	1-163-231-11	CERAMIC CHIP	15PF	5%	50V
C167	1-163-233-11	CERAMIC CHIP	18PF	5%	50V
C168	1-124-584-00	ELECT	100uF	20%	10V
C169	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C170	1-163-007-11	CERAMIC CHIP	680PF	10%	50V
C171	1-104-905-11	CAPACITOR	0.22F		5.5V
C172	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C173	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C176	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C201	1-104-760-11	CERAMIC CHIP	0.047uF	10%	50V
C202	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C203	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C204	1-109-982-11	CERAMIC CHIP	1uF	10%	10V
C205	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C206	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C207	1-163-241-11	CERAMIC CHIP	39PF	5%	50V
C208	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C209	1-124-589-11	ELECT	47uF	20%	16V
C210	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C211	1-163-239-11	CERAMIC CHIP	33PF	5%	50V
C213	1-163-131-00	CERAMIC CHIP	390PF	5%	50V
C214	1-163-257-11	CERAMIC CHIP	180PF	5%	50V
C215	1-163-227-11	CERAMIC CHIP	10PF	0.5PF	50V

Ref. No.	Part No.	Description			Remarks
C216	1-126-160-11	ELECT	1uF	20%	50V
C217	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C218	1-162-306-11	CERAMIC	0.01uF	20%	16V
C220	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C221	1-109-982-11	CERAMIC CHIP	1uF	10%	10V
C222	1-124-261-00	ELECT	10uF	20%	50V
C223	1-128-131-11	ELECT	22uF	20%	50V
C224	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C225	1-126-160-11	ELECT	1uF	20%	50V
C226	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C227	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C228	1-124-589-11	ELECT	47uF	20%	16V
C229	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C230	1-164-159-21	CERAMIC	0.1uF		50V
C231	1-124-589-11	ELECT	47uF	20%	16V
C232	1-109-982-11	CERAMIC CHIP	1uF	10%	10V
C233	1-124-261-00	ELECT	10uF	20%	50V
C234	1-109-982-11	CERAMIC CHIP	1uF	10%	10V
C235	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C236	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C237	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C238	1-124-589-11	ELECT	47uF	20%	16V
C239	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C240	1-124-589-11	ELECT	47uF	20%	16V
C241	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C242	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C243	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C244	1-109-982-11	CERAMIC CHIP	1uF	10%	10V
C245	1-109-982-11	CERAMIC CHIP	1uF	10%	10V
C246	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C247	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C248	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C249	1-109-982-11	CERAMIC CHIP	1uF	10%	10V
C250	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V
C251	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C267	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C271	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C272	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C275	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C276	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C278	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V
C279	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C280	1-124-584-00	ELECT	100uF	20%	10V
C281	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C282	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C283	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C284	1-164-489-11	CERAMIC CHIP	0.22uF	10%	16V
C285	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C286	1-163-251-11	CERAMIC CHIP	100PF	5%	50V
C301	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C303	1-126-160-11	ELECT	1uF	20%	50V
C305	1-124-261-00	ELECT	10uF	20%	50V
C307	1-126-966-11	ELECT	33uF	20%	16V
C308	1-126-963-11	ELECT	4.7uF	20%	50V
C310	1-126-160-11	ELECT	1uF	20%	50V

Ref. No.	Part No.	Description			Remarks
C311	1-163-014-00	CERAMIC CHIP	0.0027uF	10%	50V
C312	1-163-016-00	CERAMIC CHIP	0.0039uF	10%	50V
C313	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C314	1-126-964-11	ELECT	10uF	20%	50V
C315	1-126-160-11	ELECT	1uF	20%	50V
C316	1-163-024-00	CERAMIC CHIP	0.018uF	10%	50V
C317	1-124-589-11	ELECT	47uF	20%	16V
C318	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C319	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C320	1-137-374-11	FILM	0.047uF	5%	50V
C322	1-126-963-11	ELECT	4.7uF	20%	50V
C323	1-163-135-00	CERAMIC CHIP	560PF	5%	50V
C324	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C325	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C361	1-126-964-11	ELECT	10uF	20%	50V
C362	1-163-020-00	CERAMIC CHIP	0.0082uF	10%	50V
C363	1-104-664-11	ELECT	47uF	20%	16V
C364	1-126-964-11	ELECT	10uF	20%	50V
C365	1-126-961-11	ELECT	2.2uF	20%	50V
C366	1-126-964-11	ELECT	10uF	20%	50V
C367	1-104-664-11	ELECT	47uF	20%	16V
C368	1-163-020-00	CERAMIC CHIP	0.0082uF	10%	50V
C369	1-126-964-11	ELECT	10uF	20%	50V
C370	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C371	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C372	1-124-589-11	ELECT	47uF	20%	16V
C373	1-124-589-11	ELECT	47uF	20%	16V
C374	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C375	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C376	1-126-964-11	ELECT	10uF	20%	50V
C381	1-164-222-11	CERAMIC CHIP	0.22uF		25V
C382	1-164-222-11	CERAMIC CHIP	0.22uF		25V
C383	1-126-960-11	ELECT	1uF	20%	50V
C384	1-126-960-11	ELECT	1uF	20%	50V
C385	1-126-960-11	ELECT	1uF	20%	50V
C386	1-126-964-11	ELECT	10uF	20%	50V
C387	1-126-964-11	ELECT	10uF	20%	50V
C388	1-126-964-11	ELECT	10uF	20%	50V
C389	1-126-964-11	ELECT	10uF	20%	50V
C390	1-126-960-11	ELECT	1uF	20%	50V
C391	1-126-160-11	ELECT	1uF	20%	50V
C422	1-124-589-11	ELECT	47uF	20%	16V
C423	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C424	1-164-159-21	CERAMIC	0.1uF		50V
C425	1-124-261-00	ELECT	10uF	20%	50V
C427	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C500	1-163-229-11	CERAMIC CHIP	12PF	5%	50V
C501	1-163-098-00	CERAMIC CHIP	16PF	5%	50V
C502	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C503	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C504	1-163-275-11	CERAMIC CHIP	0.001uF	5%	50V
C505	1-162-199-31	CERAMIC	10PF	5%	50V
C507	1-163-137-00	CERAMIC CHIP	680PF	5%	50V
C508	1-109-982-11	CERAMIC CHIP	1uF	10%	10V
C509	1-163-016-00	CERAMIC CHIP	0.0039uF	10%	50V

MA-341

Ref. No.	Part No.	Description			Remarks
C510	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C511	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C512	1-124-584-00	ELECT	100uF	20%	10V
C513	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C514	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C561	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C562	1-104-664-11	ELECT	47uF	20%	16V
C563	1-126-935-11	ELECT	470uF	20%	6.3V
⚠C600	1-104-705-11	FILM	0.1uF	20%	250V
⚠C601	1-113-920-11	CERAMIC	0.0022uF	20%	250V
C602	1-119-886-51	CERAMIC	470PF	10%	250V
⚠C603	1-119-911-51	CERAMIC	470PF	10%	250V
⚠C604	1-119-912-51	CERAMIC	1000PF	20%	250V
C605	1-119-882-51	ELECT(BLOCK)	120uF	20%	200V
C606	1-107-905-11	ELECT	4.7uF	20%	50V
C607	1-113-681-11	FILM	0.033uF	10%	400V
C608	1-162-558-11	CERAMIC	100PF	10%	2KV
C610	1-115-322-91	FILM	0.047uF	5%	50V
C611	1-115-322-91	FILM	0.047uF	5%	50V
C612	1-126-160-11	ELECT	1uF	20%	50V
C613	1-115-739-31	ELECT	0.0015F	20%	10V
C614	1-115-789-11	ELECT	0.001F	20%	25V
C615	1-126-967-11	ELECT	47uF	20%	50V
C616	1-126-941-11	ELECT	470uF	20%	25V
C617	1-126-935-11	ELECT	470uF	20%	16V
C618	1-126-967-11	ELECT	47uF	20%	50V
C619	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C620	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C621	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C622	1-128-131-11	ELECT	22uF	20%	50V
C623	1-124-589-11	ELECT	47uF	20%	16V
C624	1-124-589-11	ELECT	47uF	20%	16V
C625	1-104-664-11	ELECT	47uF	20%	16V
C626	1-126-965-11	ELECT	22uF	20%	50V
C627	1-126-965-11	ELECT	22uF	20%	50V
C628	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C629	1-124-234-00	ELECT	22uF	20%	16V
C638	1-126-925-11	ELECT	470uF	20%	10V
C639	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C642	1-126-967-11	ELECT	47uF	20%	50V
C650	1-164-004-11	CERAMIC CHIP	0.1uF	10%	25V
C701	1-104-664-11	ELECT	47uF	20%	16V
C706	1-126-963-11	ELECT	4.7uF	20%	50V
C707	1-164-161-11	CERAMIC CHIP	0.0022uF	10%	100V
C709	1-126-933-11	ELECT	100uF	20%	16V
C710	1-164-232-11	CERAMIC CHIP	0.01uF		50V
C712	1-126-933-11	ELECT	100uF	20%	16V
C980	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C981	1-124-589-11	ELECT	47uF	20%	16V
C982	1-163-038-00	CERAMIC CHIP	0.1uF		25V
C984	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V
C985	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V
C986	1-163-038-00	CERAMIC CHIP	0.1uF		25V
		< JACK >			
CJ561	1-779-011-11	JACK, PIN 6P (LINE-1 IN/LINE OUT)			

Ref. No.	Part No.	Description	Remarks
		< CONNECTOR >	
CN101	1-779-724-11	CONNECTOR, BOARD TO BOARD 5P	
CN102	1-779-723-11	CONNECTOR, BOARD TO BOARD 9P	
* CN103	1-766-716-11	CONNECTOR, BOARD TO BOARD 3P	
CN104	1-506-469-11	PIN, CONNECTOR 4P	
CN161	1-506-468-11	PIN, CONNECTOR 3P	
CN260	1-766-986-11	CONNECTOR, FFC/FPC 13P	
* CN270	1-560-892-00	PIN, CONNECTOR 4P	
CN301	1-506-469-11	PIN, CONNECTOR 4P	
CN302	1-506-468-11	PIN, CONNECTOR 3P	
* CN403	1-573-128-11	PIN, CONNECTOR 5P	
CN404	1-506-475-11	PIN, CONNECTOR 10P	
* CN423	1-573-128-11	PIN, CONNECTOR 5P	
* CN600	1-580-230-11	PIN, CONNECTOR (PC BOARD) 2P	
		< JACK >	
CNJ980	1-779-013-11	JACK, MINIATURE(CONTROL S OUT)	
		< DIODE >	
D103	8-719-048-26	DIODE GL528V1	
D109	8-719-200-82	DIODE 11ES2	
D161	8-719-200-82	DIODE 11ES2	
D162	8-719-200-82	DIODE 11ES2	
D420	8-719-109-90	DIODE RD5.6ESB3	
D561	8-719-110-08	DIODE RD8.2ES-B2	
D600	8-719-051-93	DIODE DF06M-6031	
D601	8-719-054-32	DIODE ERA15-06TP3	
D602	8-719-058-91	DIODE AG01A-V0	
D603	8-719-200-82	DIODE 11ES2	
D604	8-719-109-62	DIODE RD3.0ES-B1	
D605	8-719-911-19	DIODE 1SS119	
D606	8-719-313-17	DIODE AU02A-V0	
D607	8-719-022-97	DIODE D2S4MF	
D608	8-719-073-18	DIODE S3L20UF34	
D609	8-719-313-17	DIODE AU02A-V0	
D610	8-719-160-64	DIODE RD16F-B1	
D611	8-719-911-19	DIODE 1SS119	
D612	8-719-109-85	DIODE RD5.1ES-B2	
D618	8-719-911-19	DIODE 1SS119	
D619	8-719-313-17	DIODE AU02A-V0	
D702	8-719-150-92	DIODE RD33EB3T	
D980	8-719-067-40	DIODE STZ6.8N-T146	
D982	8-719-911-19	DIODE 1SS119	
		< EARTH >	
ET600	1-537-770-21	TERMINAL BOARD, GROUND	
ET601	1-537-770-21	TERMINAL BOARD, GROUND	
		< FUSE >	
⚠F600	1-533-296-11	FUSE, GLASS CYLINDRICAL(DIA.5)	
		< FERRITE BEAD >	
FB101	1-414-235-22	INDUCTOR CHIP 0UH	
FB601	1-410-858-21	INDUCTOR 0UH	

Note :
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Note :
Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.

Ref. No.	Part No.	Description			Remarks
		< FUSE HOLDER >			
FH600	1-533-399-31	HOLDER, FUSE			
FH601	1-533-399-31	HOLDER, FUSE			
		< IC >			
IC101	8-759-481-46	IC LB1943			
IC160	8-759-587-76	IC M37760M8A127GP			
IC161	8-759-575-71	IC M24C04-WMN6T			
IC162	8-759-248-87	IC MM1256XF-BE			
IC201	8-759-581-54	IC LA71051M-MPB			
IC260	8-759-564-36	IC LA70011			
IC331	8-759-499-30	IC BA7755AF-E2			
IC360	8-759-559-37	IC TDA9605H/N1,557			
IC420	8-759-438-82	IC uPD16311GC-AB6			
IC601	8-759-438-18	IC PQ12RD08			
IC602	8-759-321-95	IC HA17431PA-TZ			
IC980	8-759-356-27	IC NJM2129M			
		< JUMPER RESISTOR >			
JR045	1-216-295-00	METAL CHIP	0	5%	1/10W
JR046	1-216-295-00	METAL CHIP	0	5%	1/10W
JR047	1-216-295-00	METAL CHIP	0	5%	1/10W
JR048	1-216-295-00	METAL CHIP	0	5%	1/10W
JR100	1-216-296-00	METAL CHIP	0	5%	1/8W
JR101	1-216-296-00	METAL CHIP	0	5%	1/8W
JR102	1-216-296-00	METAL CHIP	0	5%	1/8W
JR104	1-216-296-00	METAL CHIP	0	5%	1/8W
JR105	1-216-295-00	METAL CHIP	0	5%	1/10W
JR107	1-216-295-00	METAL CHIP	0	5%	1/10W
JR109	1-216-296-00	METAL CHIP	0	5%	1/8W
JR113	1-216-296-00	METAL CHIP	0	5%	1/8W
JR114	1-216-296-00	METAL CHIP	0	5%	1/8W
JR115	1-216-295-00	METAL CHIP	0	5%	1/10W
JR116	1-216-296-00	METAL CHIP	0	5%	1/8W
JR117	1-216-295-00	METAL CHIP	0	5%	1/10W
JR118	1-216-295-00	METAL CHIP	0	5%	1/10W
JR119	1-216-296-00	METAL CHIP	0	5%	1/8W
JR120	1-216-295-00	METAL CHIP	0	5%	1/10W
JR121	1-216-296-00	METAL CHIP	0	5%	1/8W
JR123	1-216-295-00	METAL CHIP	0	5%	1/10W
JR124	1-216-295-00	METAL CHIP	0	5%	1/10W
JR125	1-216-296-00	METAL CHIP	0	5%	1/8W
JR126	1-216-295-00	METAL CHIP	0	5%	1/10W
JR127	1-216-295-00	METAL CHIP	0	5%	1/10W
JR128	1-216-295-00	METAL CHIP	0	5%	1/10W
JR131	1-216-295-00	METAL CHIP	0	5%	1/10W
JR132	1-216-296-00	METAL CHIP	0	5%	1/8W
JR133	1-216-296-00	METAL CHIP	0	5%	1/8W
JR134	1-216-295-00	METAL CHIP	0	5%	1/10W
JR135	1-216-296-00	METAL CHIP	0	5%	1/8W
JR136	1-216-296-00	METAL CHIP	0	5%	1/8W
JR137	1-216-296-00	METAL CHIP	0	5%	1/8W
JR139	1-216-296-00	METAL CHIP	0	5%	1/8W
JR140	1-216-295-00	METAL CHIP	0	5%	1/10W
JR141	1-216-295-00	METAL CHIP	0	5%	1/10W
JR142	1-216-295-00	METAL CHIP	0	5%	1/10W
JR143	1-216-296-00	METAL CHIP	0	5%	1/8W
JR144	1-216-296-00	METAL CHIP	0	5%	1/8W
JR145	1-216-296-00	METAL CHIP	0	5%	1/8W
JR146	1-216-296-00	METAL CHIP	0	5%	1/8W
JR147	1-216-295-00	METAL CHIP	0	5%	1/10W
JR148	1-216-296-00	METAL CHIP	0	5%	1/8W
JR149	1-216-296-00	METAL CHIP	0	5%	1/8W
JR150	1-216-296-00	METAL CHIP	0	5%	1/8W
JR152	1-216-296-00	METAL CHIP	0	5%	1/8W
JR153	1-216-296-00	METAL CHIP	0	5%	1/8W
JR154	1-216-296-00	METAL CHIP	0	5%	1/8W
JR155	1-216-296-00	METAL CHIP	0	5%	1/8W
JR156	1-216-295-00	METAL CHIP	0	5%	1/10W
JR157	1-216-295-00	METAL CHIP	0	5%	1/10W
JR158	1-216-295-00	METAL CHIP	0	5%	1/10W
JR159	1-216-295-00	METAL CHIP	0	5%	1/10W
JR160	1-216-295-00	METAL CHIP	0	5%	1/10W
JR161	1-216-295-00	METAL CHIP	0	5%	1/10W
JR162	1-216-296-00	METAL CHIP	0	5%	1/8W
JR163	1-216-295-00	METAL CHIP	0	5%	1/10W
JR164	1-216-295-00	METAL CHIP	0	5%	1/10W
JR166	1-216-296-00	METAL CHIP	0	5%	1/8W
JR169	1-216-296-00	METAL CHIP	0	5%	1/8W
JR170	1-216-296-00	METAL CHIP	0	5%	1/8W
JR172	1-216-296-00	METAL CHIP	0	5%	1/8W
JR173	1-216-295-00	METAL CHIP	0	5%	1/10W
JR174	1-216-296-00	METAL CHIP	0	5%	1/8W
JR175	1-216-295-00	METAL CHIP	0	5%	1/10W
JR176	1-216-296-00	METAL CHIP	0	5%	1/8W
JR180	1-216-295-00	METAL CHIP	0	5%	1/10W
JR181	1-216-295-00	METAL CHIP	0	5%	1/10W
JR182	1-216-295-00	METAL CHIP	0	5%	1/10W
JR183	1-216-295-00	METAL CHIP	0	5%	1/10W
JR184	1-216-295-00	METAL CHIP	0	5%	1/10W
JR190	1-216-296-00	METAL CHIP	0	5%	1/8W
JR197	1-216-296-00	METAL CHIP	0	5%	1/8W
JR198	1-216-296-00	METAL CHIP	0	5%	1/8W
JR199	1-216-295-00	METAL CHIP	0	5%	1/10W
JR200	1-216-295-00	METAL CHIP	0	5%	1/10W
JR201	1-216-296-00	METAL CHIP	0	5%	1/8W
JR202	1-216-295-00	METAL CHIP	0	5%	1/10W
		< JUMPER RESISTOR >			
JS363	1-216-296-00	METAL CHIP	0	5%	1/8W
JS364	1-216-296-00	METAL CHIP	0	5%	1/8W
JS406	1-216-295-00	METAL CHIP	0	5%	1/10W
JS408	1-216-295-00	METAL CHIP	0	5%	1/10W
JS410	1-216-295-00	METAL CHIP	0	5%	1/10W
JS411	1-216-295-00	METAL CHIP	0	5%	1/10W
JS614	1-216-295-00	METAL CHIP	0	5%	1/10W
JS615	1-216-295-00	METAL CHIP	0	5%	1/10W
JS616	1-216-296-00	METAL CHIP	0	5%	1/8W
JS617	1-216-295-00	METAL CHIP	0	5%	1/10W
JS618	1-216-295-00	METAL CHIP	0	5%	1/10W
JS622	1-216-295-00	METAL CHIP	0	5%	1/10W

MA-341

Ref. No.	Part No.	Description		Remarks
		< COIL >		
L101	1-414-930-21	INDUCTOR	2.2uH	
L161	1-414-936-21	INDUCTOR	22uH	
L162	1-414-936-21	INDUCTOR	22uH	
L163	1-414-936-21	INDUCTOR	22uH	
L201	1-414-946-21	INDUCTOR	39uH	
L202	1-414-940-21	INDUCTOR	100uH	
L203	1-414-934-21	INDUCTOR	10uH	
L204	1-414-940-21	INDUCTOR	100uH	
L205	1-414-940-21	INDUCTOR	100uH	
L206	1-414-940-21	INDUCTOR	100uH	
L270	1-414-940-21	INDUCTOR	100uH	
L304	1-414-940-21	INDUCTOR	100uH	
L328	1-410-071-11	INDUCTOR	10mH	
L360	1-414-940-21	INDUCTOR	100uH	
L420	1-414-936-21	INDUCTOR	22uH	
L500	1-414-930-21	INDUCTOR	2.2uH	
L501	1-414-940-21	INDUCTOR	100uH	
L561	1-414-940-21	INDUCTOR	100uH	
L601	1-403-588-11	INDUCTOR	22uH	
L602	1-403-588-11	INDUCTOR	22uH	
L603	1-410-509-11	INDUCTOR	10uH	
L604	1-410-519-11	INDUCTOR	68uH	
L605	1-414-142-11	INDUCTOR	1uH	
L606	1-414-142-11	INDUCTOR	1uH	
L703	1-414-930-21	INDUCTOR	2.2uH	
L704	1-414-936-21	INDUCTOR	22uH	
		< LINE FILTER >		
⚠LF600	1-416-929-11	FILTER, LINE		
		< FLUORECENT INDICATOR >		
ND420	1-517-732-11	INDICATOR TUBE, FLUORESCENT		
		< PHOTO INTERUPTER >		
⚠PH101	8-749-013-23	PHOTO INTERRUPTER GP3S120		
⚠PH102	8-749-013-23	PHOTO INTERRUPTER GP3S120		
⚠PH600	8-749-014-24	COUPLER, PHOTO ON3131-S(LF)		
		< IC LINK >		
⚠PS101	1-532-727-11	LINK, IC	0.25A	
⚠PS600	1-532-841-21	LINK, IC		
		< TRANSISTOR >		
Q101	8-729-043-84	TRANSISTOR	PT380F3	
Q102	8-729-043-84	TRANSISTOR	PT380F3	
Q103	8-729-281-53	TRANSISTOR	2SC1815-GR	
Q201	8-729-230-49	TRANSISTOR	2SC2712-YG	
Q202	8-729-230-49	TRANSISTOR	2SC2712-YG	
Q203	8-729-216-21	TRANSISTOR	2SA1162-Y	
Q302	8-729-804-41	TRANSISTOR	2SB1122-S	
Q303	8-729-821-15	TRANSISTOR	2SD1620	
Q380	8-729-216-21	TRANSISTOR	2SA1162-Y	
Q381	8-729-230-49	TRANSISTOR	2SC2712-YG	
Q382	8-729-230-49	TRANSISTOR	2SC2712-YG	
Q500	8-729-010-05	TRANSISTOR	MSB709-RT1	
Q502	8-729-216-21	TRANSISTOR	2SA1162-Y	
Q561	8-729-010-05	TRANSISTOR	MSB709-RT1	
Q601	8-729-904-98	TRANSISTOR	2SC4054P	
Q602	8-729-012-31	TRANSISTOR	2SC4040-TL2-Q	
Q603	8-729-119-78	TRANSISTOR	2SC403SP-51	
Q604	8-729-010-25	TRANSISTOR	MSD601-RT1	
Q604	8-729-422-29	TRANSISTOR	2SD601A-S	
Q605	8-729-047-92	TRANSISTOR	2SB1398-Q(TA).S0	
Q607	8-729-140-98	TRANSISTOR	2SD773-34	
Q608	8-729-106-68	TRANSISTOR	2SD1615A-GP	
		< RESISTOR >		
R101	1-249-413-11	CARBON	470 5%	1/4W F
R102	1-216-089-00	METAL CHIP	47K 5%	1/10W
R103	1-249-437-11	CARBON	47K 5%	1/4W
R104	1-216-081-00	METAL CHIP	22K 5%	1/10W
R105	1-247-863-91	CARBON	22K 5%	1/4W
R106	1-249-400-11	CARBON	39 5%	1/4W F
R107	1-249-400-11	CARBON	39 5%	1/4W F
R109	1-216-089-00	METAL CHIP	47K 5%	1/10W
R110	1-216-089-00	METAL CHIP	47K 5%	1/10W
R111	1-216-057-00	METAL CHIP	2.2K 5%	1/10W
R112	1-216-065-00	METAL CHIP	4.7K 5%	1/10W
R115	1-216-089-00	METAL CHIP	47K 5%	1/10W
R116	1-216-089-00	METAL CHIP	47K 5%	1/10W
R117	1-216-041-00	METAL CHIP	470 5%	1/10W
R118	1-216-089-00	METAL CHIP	47K 5%	1/10W
R119	1-216-077-00	METAL CHIP	15K 5%	1/10W
R120	1-249-417-11	CARBON	1K 5%	1/4W F
R121	1-216-041-00	METAL CHIP	470 5%	1/10W
R142	1-216-051-00	METAL CHIP	1.2K 5%	1/10W
R143	1-216-065-00	METAL CHIP	4.7K 5%	1/10W
R159	1-216-097-91	RES,CHIP	100K 5%	1/10W
R160	1-216-049-00	METAL CHIP	1K 5%	1/10W
R161	1-216-073-00	METAL CHIP	10K 5%	1/10W
R162	1-249-426-11	CARBON	5.6K 5%	1/4W
R163	1-216-049-00	METAL CHIP	1K 5%	1/10W
R164	1-216-089-00	METAL CHIP	47K 5%	1/10W
R165	1-216-089-00	METAL CHIP	47K 5%	1/10W
R166	1-216-073-00	METAL CHIP	10K 5%	1/10W
R167	1-249-431-11	CARBON	15K 5%	1/4W
R168	1-216-073-00	METAL CHIP	10K 5%	1/10W
R169	1-216-073-00	METAL CHIP	10K 5%	1/10W
R170	1-216-061-00	METAL CHIP	3.3K 5%	1/10W
R171	1-216-089-00	METAL CHIP	47K 5%	1/10W
R172	1-216-073-00	METAL CHIP	10K 5%	1/10W
R174	1-216-039-00	METAL CHIP	390 5%	1/10W
R175	1-216-041-00	METAL CHIP	470 5%	1/10W
R176	1-216-041-00	METAL CHIP	470 5%	1/10W
R177	1-216-041-00	METAL CHIP	470 5%	1/10W
R178	1-216-105-91	RES,CHIP	220K 5%	1/10W
R179	1-216-113-00	METAL CHIP	470K 5%	1/10W

Note :
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Note :
Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.

Ref. No.	Part No.	Description			Remarks
R180	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R182	1-216-049-00	METAL CHIP	1K	5%	1/10W
R183	1-216-295-00	METAL CHIP	0	5%	1/10W
R184	1-216-295-00	METAL CHIP	0	5%	1/10W
R185	1-216-295-00	METAL CHIP	0	5%	1/10W
R187	1-216-295-00	METAL CHIP	0	5%	1/10W
R188	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R189	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R191	1-249-417-11	CARBON	1K	5%	1/4W F
R192	1-249-417-11	CARBON	1K	5%	1/4W F
R193	1-216-295-00	METAL CHIP	0	5%	1/10W
R194	1-216-073-00	METAL CHIP	10K	5%	1/10W
R196	1-216-295-00	METAL CHIP	0	5%	1/10W
R201	1-216-037-00	METAL CHIP	330	5%	1/10W
R202	1-216-047-91	RES,CHIP	820	5%	1/10W
R203	1-216-037-00	METAL CHIP	330	5%	1/10W
R204	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R205	1-208-830-11	RES,CHIP	100K	0.50%	1/10W
R208	1-216-295-00	METAL CHIP	0	5%	1/10W
R209	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R210	1-249-419-11	CARBON	1.5K	5%	1/4W F
R211	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R212	1-216-043-91	RES,CHIP	560	5%	1/10W
R213	1-216-049-00	METAL CHIP	1K	5%	1/10W
R214	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R215	1-216-071-00	METAL CHIP	8.2K	5%	1/10W
R216	1-216-055-00	METAL CHIP	1.8K	5%	1/10W
R218	1-216-295-00	METAL CHIP	0	5%	1/10W
R219	1-216-025-91	RES,CHIP	100	5%	1/10W
R220	1-216-295-00	METAL CHIP	0	5%	1/10W
R221	1-216-295-00	METAL CHIP	0	5%	1/10W
R224	1-216-089-00	METAL CHIP	47K	5%	1/10W
R225	1-216-295-00	METAL CHIP	0	5%	1/10W
R231	1-216-089-00	METAL CHIP	47K	5%	1/10W
R232	1-216-089-00	METAL CHIP	47K	5%	1/10W
R267	1-216-295-00	METAL CHIP	0	5%	1/10W
R270	1-216-041-00	METAL CHIP	470	5%	1/10W
R271	1-216-041-00	METAL CHIP	470	5%	1/10W
R272	1-208-788-11	RES,CHIP	1.8K	0.50%	1/10W
R273	1-216-295-00	METAL CHIP	0	5%	1/10W
R274	1-216-063-91	RES,CHIP	3.9K	5%	1/10W
R276	1-216-069-00	METAL CHIP	6.8K	5%	1/10W
R277	1-216-081-00	METAL CHIP	22K	5%	1/10W
R278	1-216-081-00	METAL CHIP	22K	5%	1/10W
R279	1-216-081-00	METAL CHIP	22K	5%	1/10W
R301	1-216-067-00	METAL CHIP	5.6K	5%	1/10W
R302	1-216-093-91	RES,CHIP	68K	5%	1/10W
R305	1-216-129-00	METAL CHIP	2.2M	5%	1/10W
R309	1-216-043-91	RES,CHIP	560	5%	1/10W
R310	1-216-071-00	METAL CHIP	8.2K	5%	1/10W
R311	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R312	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R313	1-216-051-00	METAL CHIP	1.2K	5%	1/10W
R314	1-216-073-00	METAL CHIP	10K	5%	1/10W
R315	1-216-035-00	METAL CHIP	270	5%	1/10W
R316	1-216-109-00	METAL CHIP	330K	5%	1/10W
R317	1-216-071-00	METAL CHIP	8.2K	5%	1/10W
R318	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R319	1-216-033-00	METAL CHIP	220	5%	1/10W
R320	1-217-671-11	METAL CHIP	1	5%	1/10W
R321	1-216-063-91	RES,CHIP	3.9K	5%	1/10W
R322	1-216-017-91	RES,CHIP	47	5%	1/10W
R323	1-216-081-00	METAL CHIP	22K	5%	1/10W
R324	1-216-031-00	METAL CHIP	180	5%	1/10W
R325	1-216-075-00	METAL CHIP	12K	5%	1/10W
R326	1-216-079-00	METAL CHIP	18K	5%	1/10W
R327	1-216-033-00	METAL CHIP	220	5%	1/10W
R361	1-216-083-00	METAL CHIP	27K	5%	1/10W
R362	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R363	1-208-820-11	RES,CHIP	39K	0.50%	1/10W
R364	1-216-057-00	METAL CHIP	2.2K	5%	1/10W
R365	1-216-083-00	METAL CHIP	27K	5%	1/10W
R366	1-216-041-00	METAL CHIP	470	5%	1/10W
R368	1-216-079-00	METAL CHIP	18K	5%	1/10W
R369	1-216-133-00	METAL CHIP	3.3M	5%	1/10W
R370	1-216-049-00	METAL CHIP	1K	5%	1/10W
R371	1-216-049-00	METAL CHIP	1K	5%	1/10W
R372	1-216-073-00	METAL CHIP	10K	5%	1/10W
R373	1-216-295-00	METAL CHIP	0	5%	1/10W
R374	1-216-295-00	METAL CHIP	0	5%	1/10W
R375	1-216-025-91	RES,CHIP	100	5%	1/10W
R376	1-216-025-91	RES,CHIP	100	5%	1/10W
R377	1-216-295-00	METAL CHIP	0	5%	1/10W
R378	1-216-295-00	METAL CHIP	0	5%	1/10W
R380	1-216-073-00	METAL CHIP	10K	5%	1/10W
R381	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R382	1-216-049-00	METAL CHIP	1K	5%	1/10W
R383	1-216-049-00	METAL CHIP	1K	5%	1/10W
R385	1-216-295-00	METAL CHIP	0	5%	1/10W
R386	1-216-295-00	METAL CHIP	0	5%	1/10W
R421	1-216-295-00	METAL CHIP	0	5%	1/10W
R422	1-216-049-00	METAL CHIP	1K	5%	1/10W
R423	1-216-049-00	METAL CHIP	1K	5%	1/10W
R424	1-216-049-00	METAL CHIP	1K	5%	1/10W
R425	1-216-085-00	METAL CHIP	33K	5%	1/10W
R426	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R427	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R440	1-216-075-00	METAL CHIP	12K	5%	1/10W
R449	1-216-059-00	METAL CHIP	2.7K	5%	1/10W
R450	1-216-083-00	METAL CHIP	27K	5%	1/10W
R500	1-216-049-00	METAL CHIP	1K	5%	1/10W
R502	1-216-073-00	METAL CHIP	10K	5%	1/10W
R503	1-216-049-00	METAL CHIP	1K	5%	1/10W
R504	1-216-049-00	METAL CHIP	1K	5%	1/10W
R505	1-216-045-00	METAL CHIP	680	5%	1/10W
R507	1-216-041-00	METAL CHIP	470	5%	1/10W
R508	1-216-053-00	METAL CHIP	1.5K	5%	1/10W
R509	1-216-121-91	RES,CHIP	1M	5%	1/10W
R512	1-216-295-00	METAL CHIP	0	5%	1/10W
R513	1-216-041-00	METAL CHIP	470	5%	1/10W

Ref. No.	Part No.	Description			Remarks
R561	1-216-037-00	METAL CHIP	330	5%	1/10W
R562	1-249-407-11	CARBON	150	5%	1/4W F
R563	1-249-408-11	CARBON	180	5%	1/4W F
R564	1-216-021-00	METAL CHIP	68	5%	1/10W
R565	1-216-022-00	METAL CHIP	75	5%	1/10W
⚠R600	1-219-779-51	CARBON	6.8M	10%	1/2W
R601	1-249-441-11	CARBON	100K	5%	1/4W
R602	1-249-441-11	CARBON	100K	5%	1/4W
R603	1-249-429-11	CARBON	10K	5%	1/4W
R604	1-216-451-11	METAL OXIDE	120 5%	2W F	
R605	1-215-416-00	METAL	620	1%	1/4W
R606	1-249-402-11	CARBON	56	5%	1/4W F
R607	1-215-927-41	METAL OXIDE	47K	5%	3W
R608	1-249-401-11	CARBON	47	5%	1/4W F
R609	1-249-406-11	CARBON	120	5%	1/4W F
R610	1-208-789-11	RES,CHIP	2K	0.50%	1/10W
R611	1-216-655-11	METAL CHIP	1.5K	0.5%	1/10W
R612	1-219-786-81	FUSIBLE	22	5%	1/4W
R613	1-260-091-11	CARBON	220	5%	1/2W
⚠R614	1-240-306-81	FUSIBLE	15	5%	1/4W
R615	1-249-417-11	CARBON	1K	5%	1/4W F
R616	1-247-815-91	CARBON	220	5%	1/4W
R617	1-249-417-11	CARBON	1K	5%	1/4W F
R618	1-260-091-11	CARBON	220	5%	1/2W
R619	1-249-413-11	CARBON	470	5%	1/4W F
R620	1-249-413-11	CARBON	470	5%	1/4W F
R623	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R624	1-216-430-11	METAL OXIDE	390	5%	1W F
R625	1-249-429-11	CARBON	10K	5%	1/4W
R630	1-216-049-00	METAL CHIP	1K	5%	1/10W
R633	1-216-295-00	METAL CHIP	0	5%	1/10W
R637	1-247-815-91	CARBON	220	5%	1/4W
R641	1-219-123-11	FUSIBLE	0.47	5%	1/4W F
⚠R642	1-216-374-41	METAL OXIDE	2.7	5%	2W
R643	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R701	1-216-049-00	METAL CHIP	1K	5%	1/10W
R702	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R703	1-216-039-00	METAL CHIP	390	5%	1/10W
R704	1-216-043-91	RES,CHIP	560	5%	1/10W
⚠R705	1-240-307-81	FUSIBLE	560	5%	1/4W
R706	1-216-113-00	METAL CHIP	470K	5%	1/10W
R707	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R709	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R710	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R711	1-216-061-00	METAL CHIP	3.3K	5%	1/10W
R712	1-216-295-00	METAL CHIP	0	5%	1/10W
R713	1-216-295-00	METAL CHIP	0	5%	1/10W
R731	1-216-049-00	METAL CHIP	1K	5%	1/10W
R732	1-216-049-00	METAL CHIP	1K	5%	1/10W
R733	1-216-065-00	METAL CHIP	4.7K	5%	1/10W
R734	1-216-049-00	METAL CHIP	1K	5%	1/10W
R735	1-216-049-00	METAL CHIP	1K	5%	1/10W
R736	1-216-295-00	METAL CHIP	0	5%	1/10W
R737	1-216-081-00	METAL CHIP	22K	5%	1/10W
R738	1-216-081-00	METAL CHIP	22K	5%	1/10W
R981	1-216-295-00	METAL CHIP	0	5%	1/10W

Ref. No.	Part No.	Description	Remarks
		< SWITCH >	
S101	1-762-108-11	SWITCH, PUSH (1 KEY)	
S102	1-771-155-11	SWITCH, ROTARY (MECHANICAL MODE)	
S407	1-771-574-21	SWITCH, TACTILE (EASY SET UP)	
S409	1-771-574-21	SWITCH, TACTILE (TRACKING/CHANNNEL–)	
S411	1-771-574-21	SWITCH, TACTILE (TRACKING/CHANNNEL+)	
S701	1-571-588-11	SWITCH, SLIDE (RF UNIT CH3/CH4)	
		< TRANSFORMER >	
T301	1-433-479-11	TRANSFORMER, BIAS OSCILLATION	
⚠T600	1-433-568-11	TRANSFORMER, CONVERTER (RCC)	
		< TUNER >	
TU701	8-598-473-00	TUNER, FSS BTF-MA431	
		< VARISTOR >	
⚠VDR600	1-801-445-31	VARISTOR TNR10V241K660	
		< VIBRATOR >	
X160	1-767-857-11	VIBRATOR, CRYSTAL (14.31818MHz)	
X161	1-579-463-11	VIBRATOR, CRYSTAL (32.768kHz)	
X201	1-577-380-11	VIBRATOR, CRYSTAL (3.579545MHz)	
*	A-6791-803-A	MF-316 BOARD, COMPLETE	
		**********	
			(Ref.No.:2,000 Series)
		< CAPACITOR >	
C461	1-163-809-11	CERAMIC CHIP 0.047uF 10% 25V	
C493	1-163-009-11	CERAMIC CHIP 0.001uF 10% 50V	
C495	1-163-009-11	CERAMIC CHIP 0.001uF 10% 50V	
C496	1-163-009-11	CERAMIC CHIP 0.001uF 10% 50V	
		< CONNECTOR >	
CN461	1-568-954-11	PIN, CONNECTOR (STRAIGHT) 5P	
CN491	1-506-484-11	PIN, CONNECTOR 5P	
		< JACK >	
CNJ491	1-766-861-11	JACK, PIN (3P) (LINE-2 IN)	
		< DIODE >	
D461	8-719-056-07	DIODE SLR-342MC3F (POWER)	
D491	8-719-067-40	DIODE STZ6.8N-T146	
D492	8-719-067-40	DIODE STZ6.8N-T146	
D493	8-719-422-37	DIODE MA8051	
D494	8-719-067-40	DIODE STZ6.8N-T146	
		< IC >	
IC461	8-749-011-05	IC GP1U28X (REMOTE CONTROL)	
		< TRANSISTOR >	
Q461	8-729-421-22	TRANSISTOR UN2211	

Note :
The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Note :
Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.

Ref. No.	Part No.	Description			Remarks
		< RESISTOR >			
R461	1-216-013-00	METAL CHIP	33	5%	1/10W
R462	1-216-029-00	METAL CHIP	150	5%	1/10W
R463	1-216-089-00	METAL CHIP	47K	5%	1/10W
R491	1-216-295-00	METAL CHIP	0	5%	1/10W
R492	1-216-295-00	METAL CHIP	0	5%	1/10W
R493	1-216-022-00	METAL CHIP	75	5%	1/10W
		< SWITCH >			
S461	1-762-196-21	SWITCH, TACT (POWER)			
		MISCELLANEOUS			
		**********			
⚠16	1-790-293-31	CORD, POWER			
18	1-779-725-11	CONNECTOR, BOARD TO BOARD 5P			
704	1-500-144-11	HEAD, FE			
776	8-839-057-51	DRUM ASSY, DZH-0A7A/Z-NP			
832	1-766-723-21	CONNECTOR, BOARD TO BOARD 3P			
M902	1-698-971-11	MOTOR, DC			
M903	X-3947-577-1	MOTOR ASSY, CAM			
		ACCESSORIES & PACKING MATERIALS			
		**********			
	1-575-334-11	CORD, CONNECTION			
	1-696-592-11	CORD, CONNECTION (NTSC) (FOR RF)1.5m			
	1-418-153-11	COMMANDER, STANDARD (RMT-V266)			
	3-709-432-01	COVER, REMOTE CONTROL BATTERY			
	3-865-083-11	MANUAL, INSTRUCTION (ENGLISH)			
	3-865-083-21	MANUAL, INSTRUCTION (FRENCH/CHINESE)(722/779:CND)			
*	3-987-421-01	CUSHION			
		**********			
		HARDWARE LIST			
		**********			
#1	7-685-648-79	SCREW +BVTP 3 × 12 TYPE2 IT-3			
#2	7-685-646-79	SCREW +BVTP 3 × 8 TYPE2 IT-3			
#701	7-685-646-79	SCREW +BVTP 3 × 8 TYPE2 IT-3			
#702	7-682-147-01	SCREW +P 3 × 6			
#703	7-685-133-19	SCREW (DIA. 2.6) (IT3B)			

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety. Replace only with part number specified.	Les composants identifiés par une marque ⚠ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié.

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